IAVE

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION

Good lighting, well-spaced equipment, safety glasses: marks of the safe shop—as indicated by research on accidents

(see page 7)

- Soviet Polytechnic Education and American Industrial Arts Education, Schmitt (pg. 14)
- Industry's View of Industrial Arts, Huggens (pg. 17)
- The AIAA in St. Louis (pg. 20)

June, 1961

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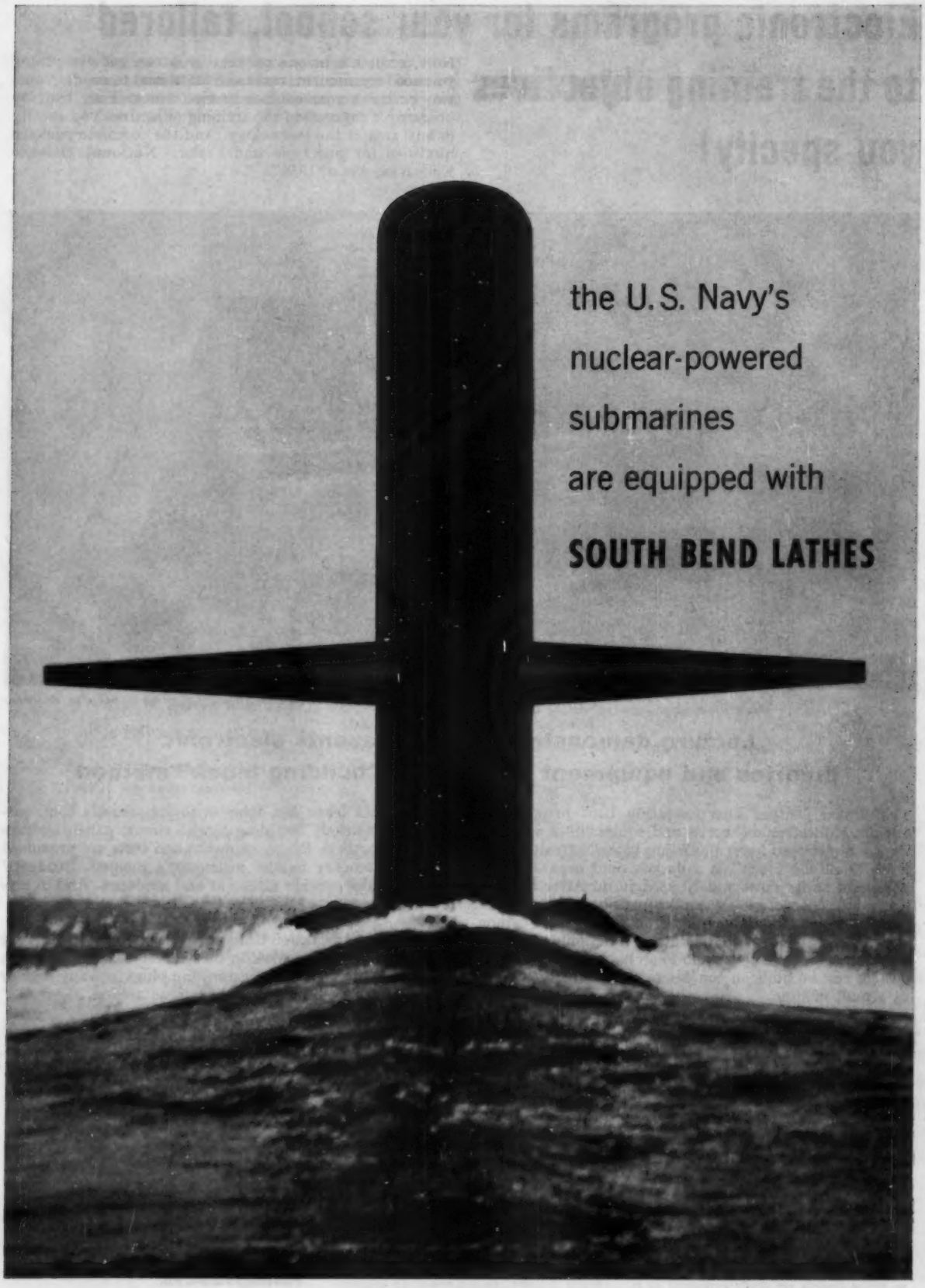

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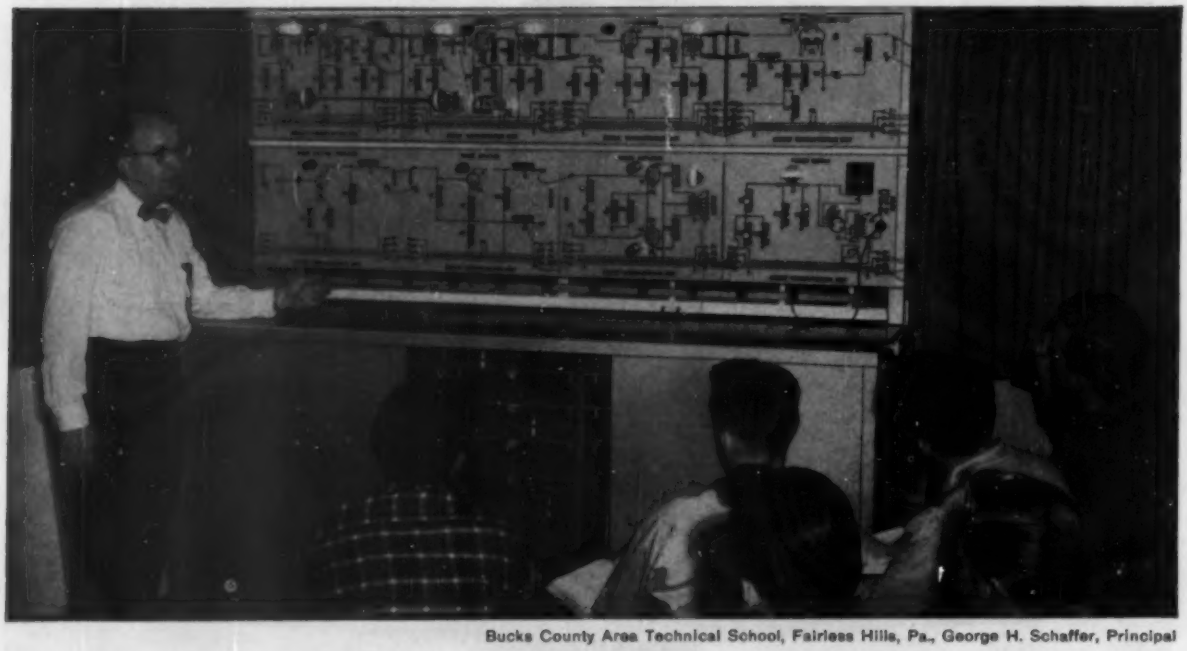

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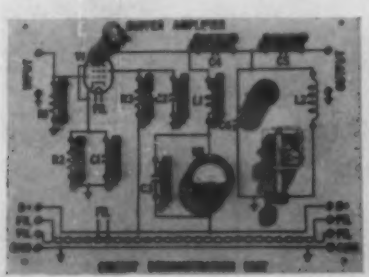

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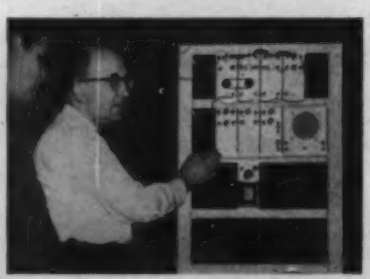

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IA/VE

Vol. 50, No. 6 / June, 1961

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THE EDITOR'S STAND

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bulletin board

At the conclusion of the school year, we've assembled in your IA/VE for June what we hope will be **a number of articles of special interest to you during the coming summer months.** These include:

1. **Industry is potentially the prime ally of industrial arts** in its battle of the local district curriculum. It has indicated in the past, however, that it does not always believe in our field; an explanation (pg. 17) of **the reason behind this situation may be well worth your summer perusal,** we believe, **for the revitalized approach to teaching it suggests.**

2. Industrial arts is as complicated as any subject area which your administrator must understand and provide for; working with him in formulating and writing down **administrative I-A policies should contribute to a much stronger and stabler program.** How a **model policy handbook** of this type was written (pg. 19) and **what it contains can serve you as a guide in this direction** — to consider during the vacation months.

3. If you're thinking about a new position for next year, you'll find the **checklist** (pg. 25) **on how to learn about new openings and how to evaluate them** (as to their suitability for you and vise versa) as helpful as anything we've ever seen along these lines.

In addition there are other features which we hope you'll have a chance to read:

1. A comparison (pg. 14) of selected characteristics of **Soviet polytechnic education and our industrial arts.**

2. A report (pg. 22) on **a series of telecasts for student and home viewing on electronics** — contents, format, procedures, etc.

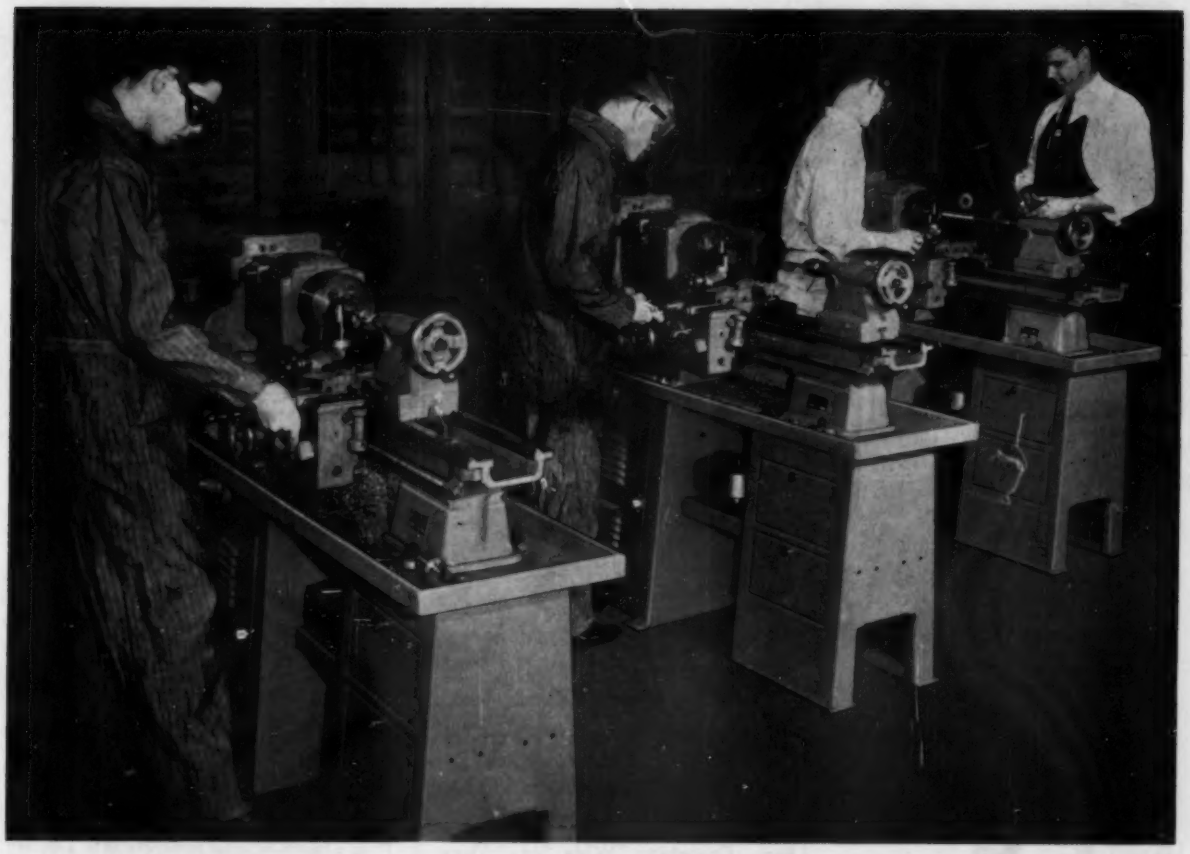
3. A review (pg. 20) of **what was said and who said it at the AIAA convention in St. Louis.**

As usual, these are a few of the highlights. Remember that there are **other articles** and an **extra large sampling of projects** (pg. 28 ff.) — a dozen ideas for the beginning and advanced student in wood, metal, plastic, graphic arts, etc. **And don't forget the regular columns!**

We've certainly enjoyed preparing these past ten issues of your IA/VE; **our hope is that you have found something of value in each number.** Any thoughts you might have toward **how we can improve your IA/VE for the next school year** will be sincerely appreciated.

And whether you're planning to head back to school or to industry for your "vacation," **we hope you'll have a pleasant summer!**

the editors



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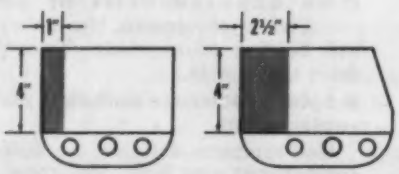

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letters

for interpreting industry

Your editorial, "Interpreting Industry, Our Weakest Objective," (see pg. 11, your IA/VE for January, 1961) has verified my thinking that this is a weak spot in the objectives of industrial arts. I find this very true after over 30 years of teaching machine and architectural drawing.

I have had the rare opportunity of being able to have cadet teachers in industrial arts in my department the past four years and I find their knowledge of manufacturing and industrial procedures is limited or nonexisting. We try to visit our local industries as soon as possible to give the cadets better concepts of the local practices in industries and how we try to gear some of these concepts to our drawing department. The reactions of the cadets after every industrial trip has stimulated my thinking in "what do these people lack" and "how to create an interest in industrial interpretations."

My own practical experience in machine shop and in the building trades was gained right after I left high school. This was ideal, but it is very difficult to do today because employment and management are more complexed and controlled.

To strengthen this weak objective along with some of the others, I would encourage some time in the teacher education colleges should be devoted to this objective in a much broader sense. By this, I do not believe just a scheduled tour of industrial plants, but perhaps a searching type of survey of procedures and industrial methods in various fields. . . . To me this can put industrial arts programs on a more meaningful plane, so industry will look our way and recognize our efforts.

O. A. Steinike, department of drafting, Beaver Dam, Wis., High School

quote, unquote

curriculum benefits from industrial arts

Industrial arts, as with every other subject in the curriculum, makes two distinct types of contributions to the accomplishments of the school — "direct" and "indirect" contributions.

Industrial arts develops an understanding of industry in our culture. If students do not know the principles of interchangeability of parts, of the relationship between amount of production and unit of cost, of specialization of labor, of automation, and of industrial organization, they are not ready to live in our industrial society. Another direct contribution is the discovering and developing of student talents in technology and applied science. Industrial arts also makes a contribution in developing problem-solving skills relating to materials and processes. Then, too, there is the skill in the use of common tools and machines that can be developed in industrial arts courses.

— Rupert N. Evans

(For more information from advertisers, use the postcard on page 59)

How Are You Fixed For—Accidents?

WILLIAM P. SPENCE
Associate Professor
Western Michigan University, Kalamazoo

The safety of the pupil in the school shop is of tremendous importance. Every industrial arts and vocational instructor should feel a deep moral responsibility to see that everything possible is done to insure safe experiences in the school shop. This responsibility is as inescapable as breathing. We, as industrial instructors, must teach safety habits and try to develop in our pupils the proper attitudes toward safety. Yet it is all too easy to find flagrant violations of even the most elementary safety regulations. Do your machines have the proper guards? Do you observe safety precautions when you, the instructor, use a piece of equipment or is safety just for the pupil? We all know that the guard on the circular saw gets in the way when the machine is used for crosscutting but do you know that you can be brought to court and made to pay if a pupil gets injured on an unguarded machine in your shop? (The states of Connecticut, New Jersey, and New York protect their teachers from financial loss in pupil injury suits through "save-harmless" statutes.)

What type of accidents are occurring? Dr. Pinckney[1] conducted a study of the liabilities of shop teachers and school districts for pupil injuries received in the school shop. Some of the cases cited in his study that were brought to court were:

1. Boy injured operating electric saw with guard removed with instructor's knowledge.
2. Boy caught fingers in belt on a jig saw. He was cleaning saw and another boy turned on switch.
3. Boy caught sleeve of sweater in lathe. Thumb amputated.
4. Boy injured hand helping instructor move auto engine, on a dolly, to another room.
5. Boy fell from scaffold on a building in a construction class.
6. Boy cut off finger tip in sheet metal shears. A second boy stepped on treadle while the first boy was trying to retrieve his metal.
7. Boy lacerated thumb dusting shavings off jointer table.
8. Boy lost his arm to the elbow when it became caught in unguarded gears of wood planer.
9. Boy lost eye when pressure gauge blew up. Instructor gave him a 400 pound pressure gauge instead of a 4000 pound gauge.

Notice that some of these accidents involved injuries actually caused by a boy other than the one injured. This does not necessarily free the instructor from liability. The law presumes that children have the capacity to exercise only such caution as belongs to children. Since school shop activities necessarily involve operating dangerous instruments and children are not expected to conduct themselves as reasonable adults, the highest degree of care is required of industrial instructors. The care required demands foresight on the part of the instructor. He must anticipate possible accident potential situations. Pinckney found that more school accidents occur in school buildings than in any other location including the school grounds. The accidents in the school shop constituted 16 per cent of the in-school building accidents. More accidents occur in the classrooms and auditorium and gymnasium than in the school shop.

In the shop he found that unguarded power saws (including the jig saw and band saw) were involved in the largest number of accidents. Unguarded planers and jointers ranked a close second. The remainder of accidents reported were of low frequency and widely scattered over many things such as welding, printing presses, and burning alcohol. It seems from this study that unguarded power equipment is a predominant factor in accidents.

Legal Responsibilities

What are the legal responsibilities of

(Concluded on page 50)

[1]Pinckney, C. W., "Liabilities of Shop Teachers and School Districts for Pupil Injuries in School Shops Resulting in Court Cases in the United States," Unpublished Doctor's Dissertation, The Pennsylvania State College, 1953.

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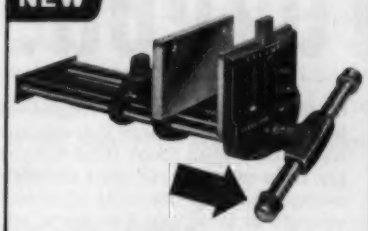

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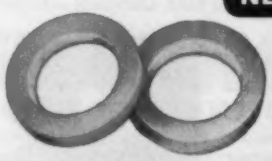

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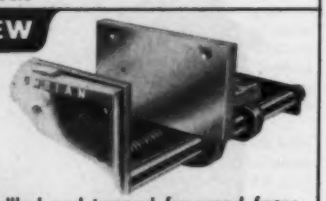

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Woodworking for Everybody

By John G. Shea. Cloth, 219 pp., 8¼ by 11¼ in., illus., $6.25. D. Van Nostrand Co., Inc., Princeton, N. J.

The is the third edition of an old favorite. Intended for both students and amateur woodworkers, it offers information about and illustrations of practically all aspects of woodworking as taught today in basic and advanced wood courses. This new edition, according to the publisher, describes and shows a variety of new portable and stationary power tools which have been developed recently. Also, new projects have been incorporated. Perhaps the most interesting chapter in the book is its introduction on "The Story of Wood" which makes use of extensive photographs and drawings to show how trees become lumber, how the American tree-farm system operates, how plywood, veneer, and laminated products are made, etc.

Engineering-Technical Drafting and Graphics

By J. W. Giachino and Henry J. Beukema. Cloth, 778 pp., 7½ by 10¼ in., illus., American Technical Society, Chicago, Ill.

An important new text in drafting, this book is impressively comprehensive — ranging from the very basic information on (1) drawing equipment, materials, and instruments, (2) drawing techniques, and (3) lettering up to data on tool and die drawing, patent drawings, structural drawing, etc. There is also an excellent chapter covering the "simplified drafting" of industry — and in many other ways this excellent book attempts to cut away at the educational lag between drafting procedure taught in schools and the drafting practices in the field. While the extensive content of the work makes it eminently suitable for technical education courses in engineering drawing, rather than drafting in secondary schools, there is a great deal to recommend it for specialized work in this area in higher grades of secondary schools.

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Engineering Drawing and Geometry

By Randolph P. Hoelscher and Clifford H. Springer. Cloth, 628 pp., 8½ by 10¼ in., illus., $8.95. John Wiley and Sons, Inc., New York, N. Y.

The second edition of a textbook for freshmen engineering students. Although it has 14 chapters in its unit on basic drawing — including lettering, use and care of instruments, orthographic projection, basic dimensioning, etc. — it stresses an understanding of principles ("reasoning processes") rather than a development of manual skills. However, the text is very easily understood and the illustrations are profuse and helpful; it could profitably be used by ambitious technical students in engineering drafting. Of the four parts — basic drawing, geometry of advanced projection systems, technical charts and graphic computations, and professional applications — the last is perhaps the most impressive in detail and practicality.

Glenn's Auto Repair Manual

By Harold T. Glenn. Cloth, 1064 pp., 6⅝ by 10¼ in., illus., $7.95. Chilton Company, Philadelphia 39, Pa.

This is a manual of automotive theory and service, giving detailed and illustrated step-by-step instructions in the process of repairing cars.

It includes a complete electrical section for every American car, including chassis wiring diagrams as well as all accessory circuit diagrams. There are almost 100 pages, and 348 pictures, to show how to overhaul all modern carburetors and a fuel injector.

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Chemistry for the Space Age

By Dan Q. Posin. Cloth, 712 pp., 7¼ by 9¼ in., illus., $5.40. J. B. Lippincott Co., Philadelphia, Pa.

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(Concluded on page 46)

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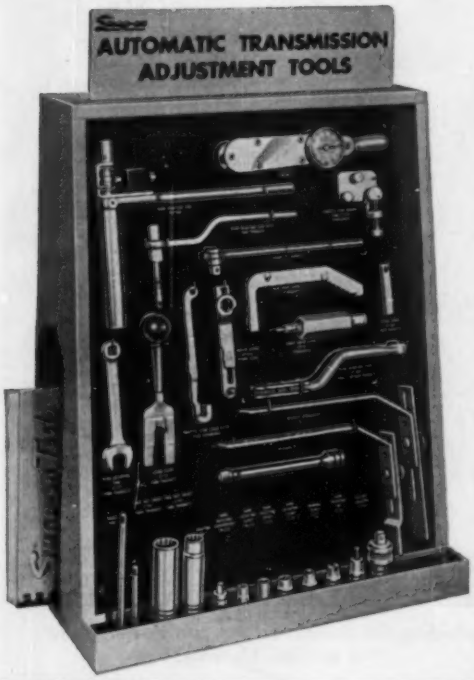

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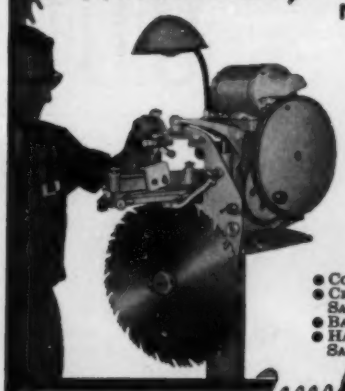

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news

industrial arts at the NEA The departmental meeting of the American Industrial Arts Association, to be held during the annual National Education Association convention in Atlantic City, June 25–30, will feature speakers Representative Frank Thompson of New Jersey and Dr. M. Ray Karnes of the University of Illinois. Rep. Thompson, a member of the House Committee on Education, has authored several bills for aid to education which were supported by NEA. Dr. Karnes, a former president of AIAA and 1960 "man of the year" in industrial arts teacher education, is a frequent speaker at state I-A association conventions. The session will be held on the afternoon of June 28, according to Rutherford E. Lockette, Trenton State College, program chairman.

student rocketeers convene Dr. Willy Ley, world famous authority on rockets and space travel, will highlight the first national convention of the Amateur Rocketeers of America, to be held in Indianapolis, Ind., August 14–18. The ARA is designed to "foster interest, aptitude, and training in the sciences of rocketry and astronautics among young people between the ages of 14 to 21." For further information on about the convention — which will include "courses" in such areas as aerodynamics and instrumentation and a "build-it-yourself" workshop in electronic computers — contact the ARA executive secretary, John G. Carlson, Suite 301, 611 N. Park Ave., Indianapolis 4, Ind.

NC teacher educators meet The North Carolina Council on Industrial Arts Teacher Education — made up of industrial arts staff members from Appalachian State Teachers College, Boone; East Carolina College, Greenville; Western Carolina College, Cullowhee; and North Carolina State College, Raleigh — held its fifth semiannual conference on the campus of North Carolina State College on Friday and Saturday, March 17 and 18. Nineteen staff members from the four institutions attended the conference, with Dr. Ivan Hostetler, chairman, presiding. The Friday evening session was concerned with the development of a recruitment film, and a Film Committee was appointed consisting of Dr. Howard Decker, chairman, James Martin, Frederick Broadhurst, and Frank E. Briley. The Saturday morning session was devoted to curriculum problems confronting North Carolina industrial arts teacher education. In the afternoon meeting, the East Carolina staff presented its curriculum for group discussion.

more summer programs Summer workshops and sessions of interest to industrial arts teachers include:

1. At Nebraska State Teachers College, Wayne, graduate and undergraduate courses in woodworking, drafting, crafts, safety edu-

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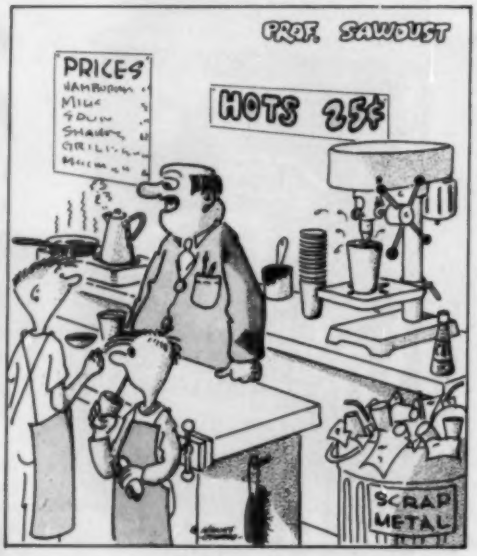

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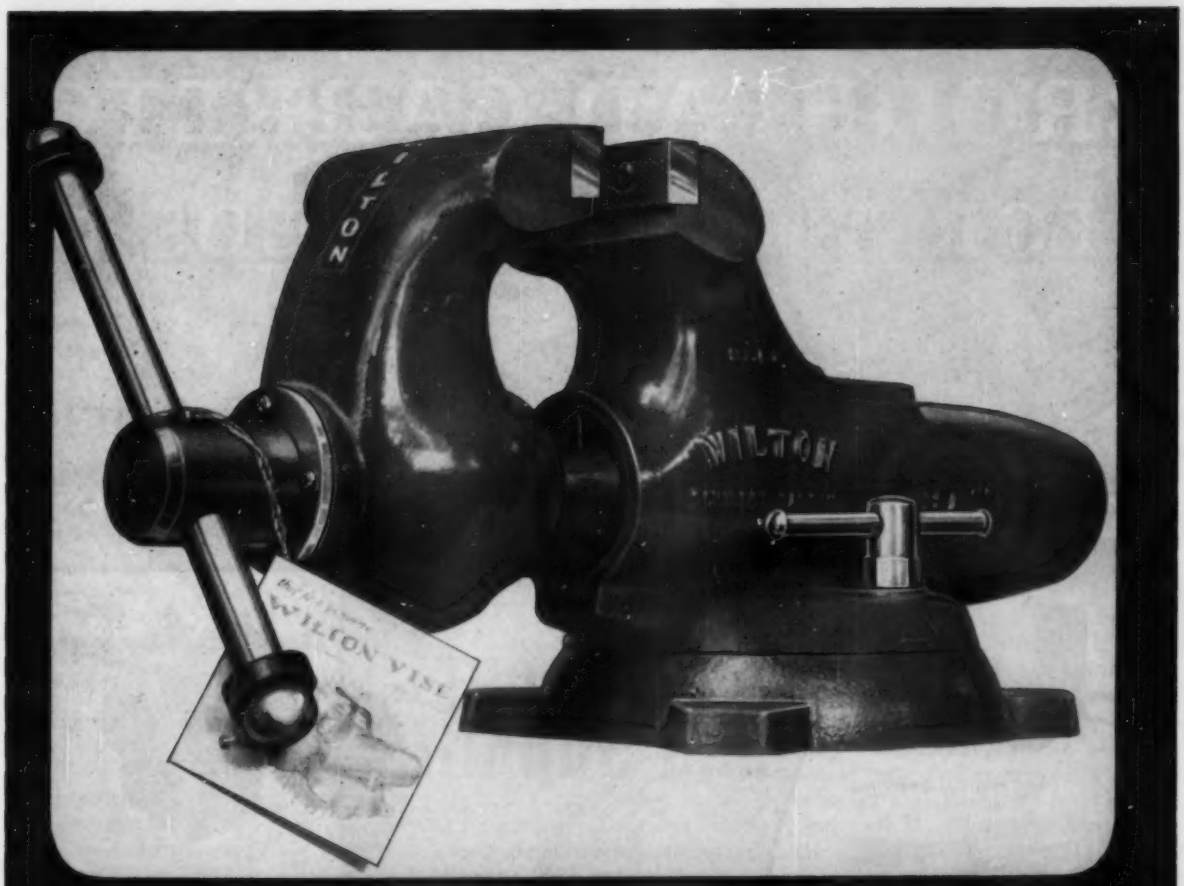

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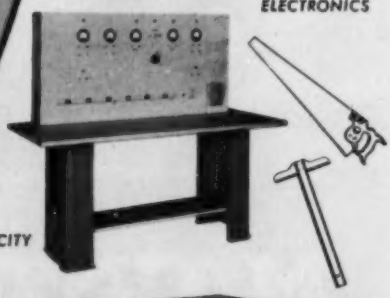

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KEEPING UP TO DATE

Every year it becomes more difficult for the industrial arts teacher to keep up to date. Recently your editor spent some time on two projects which helped to pinpoint the cause for some of this difficulty. One day was spent in the university library looking over new developments appearing in a variety of educational journals. Some topics dealt with the problems of multi-purpose rooms, high school buildings designed for team teaching, the use of teaching machines, and similar concepts. A second day was spent in an examination of issues of magazines for engineers which are beamed toward keeping them up to date on advancements in new products. A glance through these pages reveals new information on die casting aluminum, explosive forming, broaching, beryllium as a space-age metal, welding techniques, fasteners, and so forth. These, of course, represent only a few of several hundred trade magazines. Any perusal of current trade magazines brings greater realization of the recurrent question: *"Is* it possible to keep up to date in education and technology?" There are, for example, over two million different types — not sizes — of fasteners in use in American industry!

What, out of all of this technical information on only one small phase of one area, can we industrial arts teachers be expected to know and teach? If industrial education is to extract its content from technology and industry, then we certainly have a responsibility to keep up to date. But how? It has been said that the average school program is 20 years behind the times. Can we afford this kind of lag in our education system?

Far too many of our teachers make no attempt whatsoever to keep up to date with what is going on in industry. They are perfectly content to teach the same thing year in and year out. These are the teachers who repeat one year of experience 20 or 30 times. Others do make some attempt. Every so often they see or hear of new ideas which appeal personally to them, and off they go on a tangent overemphasizing some not-too-important development. There are many teachers who want to keep up to date but who need a plan, a format, or a push in the right direction.

Four Points on Keeping Up to Date

How can we be assured that our profession will keep in tune with modern industry? How can we help ourselves to know about and pass on important disclosures in industry and technology? We hope the following suggestions may be helpful:

1. We should assign groups of college and university teachers to follow the evolvement of industry. This group should choose the developments which should affect our instructional programs. This material should be made available in summary reports; from this mass of material we can choose those items that are truly important and significant.

2. We should demand that publications, both books and magazines, reflect these new developments. It is not enough, however, to report that things are happening in industry. We must find ways of adding these items to our school programs. The material must actually be taught or it adds nothing to our programs.

3. We should ask teacher education institutions to assume a primary responsibility for keeping up to date. We need more content courses on a graduate level that will reflect new technological developments. We overemphasize professional courses at the graduate level. Certainly, a candidate for a doctoral degree in science expects to do advanced study and research in the field of his specialty. We cannot expect to have qualified college teachers in technical areas if content courses are offered only at the undergraduate level.

4. We should institute in-service training programs for all industrial education teachers and require participation by all. All too often, the very teachers who most need in-service training are those who carefully avoid it. The president of a large company employing thousands of engineers recently stated that one engineer in his company who continuously fails to take in-service courses is worthless to the company is less than ten years; in fact, he is not only worthless, but an actual liability to the concern. This company executive went on to say that the company would be ahead to pay that engineer a yearly retirement salary, rather than to keep him on the job!

The problem of keeping up to date is going to increase as the tempo of technological change rises. We have a responsibility to ourselves and to our students to do something about it.

John L. Feirer

▶ A comparison of **characteristics of Soviet** (in a 10-year general school) and American approaches to industrial arts in selected categories —

Soviet Polytechnic Education and American Industrial Arts Education

MARSHALL L. SCHMITT

Definition

1. Polytechnic education deals with — understanding the various technics of industrial and agricultural production; the application of scientific principles to mass production; the organization and utilization of workers; the development of habits of work and technical abilities; and the planning of jobs involving self-discipline and initiative.

1. The industrial arts, as a curriculum area in the public schools, provides the setting for pupils to learn about industry — the user of science — and experience the act of creating from materials, new and different forms which have greater human value. In so doing, students will be able to understand and be sensitive to materials, processes, operations, machines, tools, mass production, opportunity for work, quality of products and services, maintenance, safety, the significance of technology, and its effect on society and on the individuals within that society.

Relation to Other Subjects

1. Closely related to science and mathematics and all other subjects.
2. School garden plots and workshops serve as practical laboratory testing areas for applied science and technology.
3. Closely related to drawing. Very little planning by students themselves. No individual plan sheets.

1. Sometimes correlated with physical science and other subjects. No major effort to correlate except in recent years.
2. No garden plots but workshops sometimes serve as practical laboratory testing areas for applied science and technology.
3. Closely related to drawing. Much individual planning by students and use of separate plan and procedure sheet.

Titles of Courses

1. Drawing (grades 1–6) required.
2. Technical drawing (grades 7–12) required.
3. Labor training (grades 1–7), handicraft work in lower grades; upper grades have subject matter courses like locksmithing (metalwork) and joinery work (woodworking) (required).
4. Fundamentals of production (grades 8–10) (industrial and agricultural) courses like machine study, fundamentals of plant breeding, and industrial production (required).
5. Production training in specific enterprise, observation and actual work in industry in ninth grade, 10-year school plan. Also, fall and spring work on garden plots. Summer practice between grades. Variety of industries used within any geographic area.
6. Senior grades: no comparable shops or laboratories, except as noted in No. 7 and No. 8.
7. Electrotechniques.
8. Automobiles (city schools) and tractors (rural schools).

1. Art experiences (grades 1–8) of which drawing is a part, are a requirement of the elementary school program.
2. Mechanical drawing (drafting) (grades 7–12) not required.
3. Construction activities and handicraft work, or elementary industrial arts (grades 1–6) not required.
4. Industrial arts, general shop, or individual subject matter courses like general metalwork, general woodwork, electricity, etc. Grades 7 and 8 usually required for boys only.
5. No planned industrial arts work experience in industry or agriculture; only observation trips. (NOTE: Some schools have work-experience education programs either for general education or vocational purposes. Industrial arts teachers, with special training, sometimes act as co-ordinators of the program.)
6. Senior grades: industrial arts, general shop, crafts, general woodwork, general metalwork, graphic arts, etc.
7. General electricity and electronics.
8. Automechanics, transportation, or power mechanics.

Dr. Schmitt, shown at the left making notes during talks with a Soviet professor and students in a Moscow Pedagogical Institute, is consultant for industrial arts with the Office of Education in Washington and a member of the editorial advisory board of IA/VE.

Curriculum

1. Curriculum planned at Ministry of Education. Program is same in all schools and obligatory.
2. Identical textbooks in grades 8–10. Grades 5–7 do not now have textbooks — only teacher's guide (future plans, however, are to include textbooks for pupils).
3. Work experience in one or several industries in area, such as (city schools) machine-building plants; textile industry; building construction; electrical, etc. (232 hours in ninth grade). In rural schools, work experience is conducted on farms.
4. Girls and boys take same courses.

1. Curriculum planned by state and local school systems. Varies from city to city and state to state.
2. Textbooks vary according to school or state authorities. Texts for pupils in grades 7–12.
3. No planned work experience.
4. Boys take industrial arts, while girls take homemaking.

Production Work

1. Considerable amount of actual production work done in class and after school.
2. Pupils and schools receive remuneration for work done on production work in class, after school, and during summer practice.
3. Production work co-ordinated closely with economy and factories in the school area. Also production for school's use.
4. Students work extensively on school grounds to improve them.

1. Little actual production work done in class. None after school.
2. No remuneration given. No work experience required. Schools do not receive remuneration from students' work.
3. Production work done by pupils in limited quantities for school's use or pupils' — purpose is to learn about mass production principles and problems and not to develop production skills for job occupation.
4. Very little student work on school grounds.

Teacher

1. Trained in 5-year pedagogical institute, or from the ranks of industry with in-service courses.
2. Assistant teachers used extensively. Assistants have industrial backgrounds and in-service pedagogical training. No degree.

1. Minimum of 4-year baccalaureate degree. Many have master's; some, doctor's.
2. No assistants.

Methods of Teaching

1. Lectures, visual aids (all types, especially charts), demonstrations, group and individual instruction. Much emphasis on individual instruction.
2. Very little student planning but some co-ordinated with drawing classes.
3. Use of experiments in electrotechnics course.
4. Use project method but usually follow a model.
5. Technical drawing classes work primarily from wooden models (simple to complex). Also, have problems selected from text. Mostly machine type drawing.
6. Use teaching assistants.
7. Students clean up shop — select one leader in group at beginning of semester; simple organizational plan.
8. Students are required to make penciled sketches of article to be made from the teacher's drawing on the blackboard. Procedure also discussed.
9. Teachers follow detailed prescribed course of study from Ministry of Education. All students make the same article.
10. Reference books located in library and in shops.
11. Homework assignments not generally given, grades 5–7.
12. Same teacher gives both theoretical and practical work, although assistance is used for practical work also.
13. Written tests (control work) begins in eighth grade.
14. Conscious effort made to correlate workshop courses with science and other courses.

1. Same. Not quite as much individual instruction. Not so formalized.
2. Much student planning. Some co-ordination with drawing classes.
3. Same, but more actual project work.
4. Use project method with much student planning, but sometimes follow models.
5. Very little use of models. Problems selected from texts. Includes machine, architectual, sheet metal, electrical, drawing, etc.
6. Do not use teaching assistants.
7. Personnel organization usually patterned after industry; elaborate organizational plan.
8. Similar, but plan sheet used with procedure and cost determined primarily by student.
9. State and/or local course of study used. Students sometimes make the same project; more often students make different articles involving similar operations and processes. Much individual planning encouraged.
10. Same, although much more emphasis on reference books and facilities for reading.
11. Same.
12. Same.
13. Tests given at whatever grade is taught as separate subject; for example, 6–12.
14. Only in recent years has there been much conscious effort to correlate work in industrial arts with science and other courses.

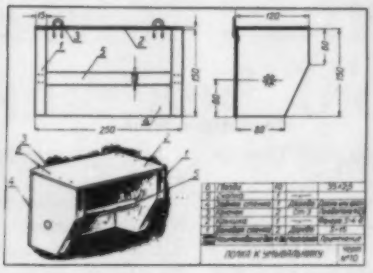
Organization and Operation of Courses

1. When classes meet 2 or 3 hours per week, the hours are coupled together.
2. Length of single class period: 45 minutes.
3. Work experience (10 year schools) 4 hours per week coupled together. Students work at various places in the factories and on farms. Have co-ordinating groups in the industry and school.
4. No student fees.
5. Rotate students from shop to shop or activity to activity to get desired experience (for example, ½ semester in woodwork, ½ semester in metal).

1. Classes usually coupled together when period is 45 minutes or less; otherwise, meet singularly. Double periods are common in senior high schools.
2. Length of single class period: 45–55 minutes.
3. None.
4. Nominal student fees. Student usually pays for individual project.
5. Same.

Left: a fifth grader drilling in a mechanical workshop of a Leningrad school. Right: an eighth grader studying elementary machine work in the same workshop.

Below: a typical polytechnic project.



Equipment and Facilities

1. Equipment and facilities vary from school to school.

2. Patron factory for each school. Used equipment is given to school free. Sometimes, the proceeds from student production work is used for school equipment.

3. Separate building and/or special shop within the schools. Lower grades use regular classroom.

4. Use of factory or farm equipment in work experience.

5. Pupils do not pay for materials. Can take individual articles home.

6. Students help repair machinery and construct items of equipment for workshops.

7. Ordinary hand tools, garden equipment, and supplies are used in elementary grades.

8. Typical woodshop: 20 single place, wood benches with two wood vises; 3 wood lathes, full size; 5-inch jointer; hand tools; drill press; 7-inch circular saw; closets; storage room for supplies (meager); various hand tool sets for each student.

9. Workshop designed for 20–25 pupils is approximately 19 by 33 ft. Sometimes separate classroom for theoretical instruction.

10. Metalworking shop (mechanic's shop or locksmith's shop): 20 metal vises on benches; drill press; small heat treatment furnace; grinder; hot plate; soldering irons; arbor press; small hand tools for cutting and filing metal, and sometimes a metal lathe; arbor; storage facilities.

11. Machine study shop: 4 metal lathes, 10-inch swing, 4-foot beds; small metal lathe; milling machine; grinder; shaper; vertical milling machine; drilling machine; benches; furnace; teacher's desk.

1. Same.

2. New equipment purchased by state and/or local funds.

3. Separate buildings and/or special shop within the schools. Lower grades use regular classroom but sometimes have separate room.

4. Generally, none used; but sometimes borrowed from or given by industrial groups. Surplus equipment purchased at nominal cost.

5. Pupils generally pay for material they use (nominal cost).

6. Same.

7. Same, but no garden equipment.

8. General woodworking: 4 to 6, 4-station woodworking benches with four metal vises; 8-inch jointer; 10-inch circular saw; disk and spindle sander; 4 wood lathes; finishing room; storage rooms (supplies adequate); surfaces; jig saw; handsaw; planning and office facilities. Various handtools but not enough for each student to have his own set.

9. Workshop designed for 20–25 pupils is approximately 40 by 60 feet not including storage facilities. Sometimes separate classroom for related (theoretical) instruction.

10. Activities considered a part of general metalshop. See No. 11.

11. General metalshop: 6, 4-station benches; shear; drill press; shaper; 4 lathes; arbor press; spinning lathes; welder; sheet metal machines; forge; foundry; anvil; finishing room; planning and office room.

Research

1. Great efforts are currently under way to find ways and means to make a better connection between school and life. Considerable research on role of labor and attitude toward work and fellow workers in the process of schooling. ◀

1. No major directed effort but considerable amount of research on various aspects of total program. ◀

The above material was excerpted from "Implications of Soviet Polytechnic Education for Industrial Arts," one of the working papers of last year's Office of Education conference on industrial arts — a complete report of which is soon to be published.

The comparison of polytechnic (as provided in the 10-year general school) and industrial arts education was designed to supply a general understanding of the former by showing some of the similarities and differences of the two programs in selected areas. According to Dr. Schmitt, "It should not be assumed that this comparison implies that industrial arts is the same as polytechnic education — far from it — because the aims and the methods to achieve these aims of the total educational systems of the countries, of which these two programs are a part, are different. The comparison, however, does indicate that both educational systems are concerned about pupils having the opportunity to understand about the "arts of industry," and technology is an important aspect of the culture of both nations. . . ."

Industry's View of Industrial Arts

S. D. HUGGENS

- Part of the cause of the decline of industrial arts may be due to the lack of active sponsorship of industry.
- Here is one version of what industry thinks of our field with practical suggestions on how we can meet the needs resulting from this view.

Before[1] we consider industry's views of industrial arts programs, let us look briefly at a number of comments that will serve to open our minds for the task at hand:

1. "Industrial Arts is not only losing the college-bound student, it is losing students on all levels. Percentagewise enrollment is decreasing at a rather sharp rate. This is due primarily to the fact that Industrial Arts does not make enough educative good sense to command the necessary respectability. But we try to put the blame on an overemphasis of some other fields. It is time to take stock of our predicament. Ten years from now will be too late."[2]

2. "A Call To the Profession To Vigorously Attack and Solve Its Own Problems" was the theme of a Conference On Industrial Arts, held in 1960 by Marshall L. Schmitt, Specialist for Industrial Arts, Office of Education, Department of Heatlh, Education, and Welfare, Washington, D. C.

3. Are employers failing to anxiously seek out industrial arts graduates? Do the drones really have any place in the industrial arts program? Industrial arts as is was fine for the industrial revolution, but what about the space age?

Now that we have been alerted by comments made by members of your profession as well as members of industry, perhaps we should analyze all of this to see what meaning it really has for us. Let us analyze by looking deeper into: (1) industry's views, (2) suggestions and comments of ways to fill the needs highlighted in these views, and (3) a challenge for all of you.

Industry's Views

No curriculum is now meeting our total industrial needs. You folks may be in the best position to do something about it, but up until the present time you haven't. It is logical that you should ask, what do we in industry need?

1. We need people with the theoretical background knowledge of industrial machinery, tools, and equipment.

2. We need people with a knowledge of industrial processes.

3. Business knowledge is becoming increasingly important.

4. Safety must become a "way of life" rather than a set of rules that will soon be forgotten.

5. There must be respect for machinery, tools, and equipment. Present-day investments in tools and equipment may run into tens of thousands of dollars per employee.

6. Teamwork is most essential to a modern day business.

7. Social processes will need more attention to increase understanding.

8. Better understanding and appreciation of unions.

9. The economics of a business.

10. The meaning of a "fair day's work for a fair day's pay."

11. A sense of responsibility.

No list could ever be complete but this one does give you some major areas on which to focus your attention. Presenting them seems in line with a comment made by Lawrence Derthick, former Commissioner, U. S. Office of Education. Dr. Derthick had indicated that industrial arts and industry should be working together more closely on the problems found in industry.

Now let us take a look at *suggestions and comments of ways to fill some of the needs highlighted in these views.*

A point of encouragement to start with is that you don't need to change the present objective of industrial arts to effect an adequate program. All you need to do is to live up to your objective. There are many different wordings of the objective of industrial arts, but generally they all say the same thing, so allow me to quote the following as a point of reference: "Industrial Arts is that part of general education which provides study of the industrial and technical aspects of our economy. It involves laboratory and research experiences in the organization, tools, material, processes, and social problems of modern industry."

You can see that your objective is very sound but what you need to do in order to fulfill this objective is to become *curriculum* oriented and not *project* oriented. Your program at the present time is centered around projects instead of concepts.

Earlier we referred to the Conference On Industrial Arts, sponsored by the Office of Education in Washington, D. C. A report issued following this conference contains the following quotes: "If we will find our way out of our present dilemma, it appears that we had better discard the guides we have been using for half a century. The old ones have been leading us in circles, and as a result, we now have essentially the same curriculum with which we started. . . . The word 'shop' needs to be dropped from our vocabulary as a subject and especially from being listed on student and school schedules. Industrial arts as a general curriculum area or the course

Mr. Huggens is manager of Camden Training, Radio Corporation of America, Camden, New Jersey.

[1]Adapted from a speech delivered by the author to the New Jersey Industrial Arts Association Convention, Asbury Park, March 10, 1961.

[2]Olson, Delmar W., "Reactions to a New Look at Industrial Arts," *IA/VE*, p. 26, May, 1960.

". . . No curriculum is now meeting our total industrial needs. . . . Your objective is very sound but what you need to do in order to fulfill this objective is to become curriculum *oriented and not* project *oriented. Your program at the present time is centered around projects rather than around concepts. . . ."*

itself should be used. . . ." These thoughts seem to amplify the points we are making here and will begin to indicate the direction you will need to take.

Industrial Processes

Now in our comments on industry's needs we mentioned a knowledge of industrial processes.

In your program you need to be teaching individuals the ability to look at any item in a room and be able to tell how this item was made, approximately how much it should cost, how it might possibly be made better or more economically, etc. Let us look at the printing business as an example. This is a big business in America. Your program should not be oriented in the direction of how to set type but rather in the direction of teaching the total process from author to book or magazine publisher to consumer.

In the February, 1961, issue of IA/VE there was an article[3] describing a program where students make up display boards on typical fabricated items found in industry. These display boards show the item from raw material stage through machining and final assembly. The parts in the various stages are mounted on boards. Each boy who makes up a board explains his project to the class. Sometimes field trips to industry are used to supplement these projects. I mention this in some detail since it indicates one way of communicating the industrial processes. It indicates also that you gentlemen will have to keep on the alert for new innovations in order to fulfill many of the needs of industry or business.

Now if you will shift your thinking again there is another area on which we need to comment. You will have to spend more time on teaching students to read and interpret prints so that they will be able to answer many different and difficult questions about these prints. In order to do this, less time may have to be spent on the mechanics of drawing and more time on the ability to interpret drawings. Industry is also beginning to do more with simplified drafting which should affect the nature of your drawing program.

Research and Experimentation

Turning to industry again, we find there is much research and experimentation to develop a new product. We can ask the question, do we not experiment in our chemistry labs and our physics labs? Why then do we not consider experiments in our wood and metal shops or within our industrial arts program? In the November, 1960, IA/VE there appears an article[4] on "How To Use A Research — Experimentation Approach" which highlights the type of thinking that we need to include in all our programs.

Mass Production

Now let us take another look in a different area. You have individual projects in school where by comparison we have so-called group projects in industry. In industry we are concerned with mass production so possibly you should consider this for many of your students. This would give them an opportunity to learn what it is like to lose the aesthetic values we normally enjoy when we build something completely by ourselves. This would also give you an opportunity to place your students in accordance with their abilities to parallel the type of thing they will be encountering in industry. You could stress quality, inspection (actually having rejects), and could set time limits for various operations. And here is an added thought. Wouldn't it be wonderful to organize two groups from your class who would be in competition with one another to produce the same product — one unionized, and one that is not. With the nonunion group you could employ any flexibilities needed in order to get your job done. But with the group that is unionized, you would not permit them to change jobs or to do another man's job even though one fellow is caught up and the other is overloaded with work. With the latter group you should not permit them to improve methods or change time standards. Other innovations could be introduced and comparisons made. This could be a wonderful lesson in industrial work.

Time will not permit a detailed account of all the ideas that should be exchanged here. Perhaps an illustration will suffice for all of the other thoughts. All of you here have reasonably good scientific backgrounds and as such, I am sure that you have often heard the phrase — nature abhors a vacuum. We can further illustrate this by pointing out that if there were empty chairs in this auditorium, those chairs would not really be empty but rather would be filled with air. The point I am trying to make is that we must never forget this phenomena. Where you people fall short of meeting a need, there is a vacuum; if you don't fill it with something, someone else will.

The junior achievement movement in America today has had great success in filling a vacuum that has been left by you folks. If there are any of you here today that are not familiar with this movement, you had better make it of extreme importance to find out all about it. Where you have failed to attract the academic and other more able students, junior achievement has had great success. Students should want to get into your program as much as they want to get into the junior achievement movement.

A Challenge

In accordance with an earlier statement, I should like to leave you with *a challenge.*

If your boards of education can not see a well-defined and meaningful industrial arts program and curriculum, industrial arts will eventually disappear. If industrial employers would reach the point where they are asking for your graduates — those who have completed the "new approach in industrial arts education" — you would no longer have any problem attracting good students and you would no longer have so many problems getting the support that you want from your administration and board of education.

You gentlemen have within your grasp the ability to change the educational thinking and influence a curriculum change within the next five years as much as the scientifically-minded have influenced educational thinking in the past two or three years as a result of the advent of the Sputniks. It is just as important or more so to have people who know how to build these Sputniks bigger, better, and cheaper. The future is up to you. Good Luck.

[3]Cecil, Louis R., "Providing Activity — Projects Plus, *IA/VE*, p. 25, February, 1961.

[4]Earl, Arthur D., "How to Use a Research — Experimentation Approach," *IA/VE*, pp. 23–25, November, 1960.

The unique (and somewhat complicated) structure of industrial education requires a declaration in the form of a written policy . . . and here is an analysis of the content of one approach —

How to Prepare a Guide for I-A Policy

DAVID O. TAXIS

Industry, business, labor, or any kind of organization that deals with people, has found that the establishment of written policy has been advantageous to more efficient operation.

School administrators are faced with many kinds of problems. Their staff consists of such groups of people as clerks, custodians, etc. Those among the teacher group have divergent interests and backgrounds of training. General policies are common in school administration and are effective for purposes for which they have been written. Many times, however, it becomes necessary to establish specific policies for the several different types of educational programs. One of these groups is the industrial arts program.

Industrial arts has many unique functions, equipment, types of instruction, and supplies. Administrators are somewhat reluctant to move into this instructional area and offer their invaluable help to the teachers in this field because of their lack of training in this area. As problems arise and are brought to the attention of the local administrators, they are solved on the spot. Many times an answer must be given or a solution suggested after a very trying day or a recent meeting with irate parents or teacher groups, in which case the decision is sometimes made on an emotional basis. All decision makers would agree that this is not the best time to arrive at a decision.

The Los Angeles County Industrial Education Association, an organization with a potential of over 700 industrial educators representing approximately 75 school districts in Los Angeles County, recognized this as a problem. The association is intensely interested in the improvement of instruction in all educational areas, and particularly in the industrial education area. They referred this problem to their executive council for study and it, in turn, appointed a chairman, Mr. Harvey Ristow, an instructor in the Whittier Union High School District. To further study this problem, Mr. Ristow selected a committee of teachers and administrators who were duly appointed by the executive council and the work began.

This group recognized that it was dealing with many school districts and boards of education. It realized that problems would differ with each school district, and sometimes with each school. It accepted also the fact that it could not suggest definite policy regarding the many problem areas in industrial arts education. It concluded that the thing it could do would be to establish a guide for each district, or school, so that teachers and administrators working together could formulate their own written policy for this instructional area. With the help of many teachers and administrators interested in the program, it identified specific items that have often needed clarification.

Mr. Taxis is consultant in industrial arts education for the County of Los Angeles schools.

Major Topics

Five over-all topics were established under which specific items were placed. The five over-all areas were general policy, equipment, supplies, safety, and teacher policy. Specific policies under the over-all categories selected by this committee are listed as follows:

General Policies
- Educational Philosophy
- Industrial Arts Education Program

Equipment and Supplies
- Budget
- Equipment
- Inventory
- Maintenance
- Requisitions
- Supplies
- Surplus Property (Education)

Student Policies
- Attendance
- Discipline
- Field (Study) Trips
- Girls in Industrial Arts
- Grading
- Industrial Arts Clubs
- Industrial Arts Contests

Safety Policies
- Accident Reports
- Insurance
- Safety Tests and Guides
- Shop Dress

Teacher Policies
- Audio-Visual
- Before and After School
- Channels of Communication
- Course of Instruction
- Conferences and Conventions
- Collection of Money
- End-of-Year Responsibilities
- Exhibits
- "G" Jobs
- Gifts or Donations
- In-Service Education
- Professional Organizations
- Reports
- Reproduction of Materials
- Shop Planning
- Substitute Teachers
- Teacher Evaluation
- Visitation

Specific Examples

Other people designing such a guide might add or stress other items; however, this was adequate for the needs of the teachers in Los Angeles County. Following are three examples of how this guide assists in promoting thinking among teachers and administrators.

(Concluded on page 44)

The AIAA in St. Louis

For members of the industrial arts profession, the week following Easter offered a good opportunity to sing the old refrain, "Meet Me In St. Louis," for that is exactly what did happen to about 2200 members of the industrial arts teaching profession.

The theme of the American Industrial Arts Association convention was "Technological Advance — Needed Changes in Industrial Arts." It was, undoubtedly, the finest and best organized convention that the association has had in its 23 year history. Much of the credit for its success is due to the excellent convention personnel who provided an outstanding program.

On Tuesday, most of the meetings were planned for the affiliated organizations of American Industrial Arts Association. These included: The American Council of Industrial Arts Supervisors, The American Council of Industrial Arts Teacher-Education, and the American Council of Industrial Arts State Association members.

Wednesday morning, the American Council of Industrial Arts Teacher Education held its annual yearbook presentation breakfast. At this meeting, Wesley Stephens presented to Dr. Ralph C. Bohn the first copies of the ninth annual yearbook titled, "Graduate Studies in Industrial Arts." Dr. Bohn and Ralph Norman served as editors for this excellent publication. The highlight of the breakfast was the presentation to Dr. Ivan Hostetler of the plaque for the "Man of the Year." The presentation was made by Dr. Marshall Schmitt, Specialist of Industrial Arts in the U. S. Office of Education. Dr. Hostetler, who has served this past year as president of the American Industrial Arts Association, received this award on the basis of his outstanding contributions to the teaching profession and particularly to industrial arts.

comments and quotes

▸ *Dr. Marshall Schmitt, specialist in industrial arts, speaking on the purpose of industrial arts stated, "The industrial arts should be that part of general education which develops in the learner an intelligent understanding of the technical aspects of our society. The industrial arts should also provide opportunities to discover and to develop technical talents possessed by some individuals."*

▸ *Dr. Kenneth Brown who, with the help of Mrs. Brown, has served for many years as the executive secretary for the association on a part-time basis, was happy to announce that Kenneth Dawson was recently appointed full-time executive secretary for the American Industrial Arts Association with offices in the NEA Building in Washington, D. C. Dr. Brown traced the history of the problems of securing a full-time secretary for the association at the business meeting.*

▸ *The interesting exhibit of the "Manual Training Program at Washington University in 1895 Era" was on display at the convention. Students of industrial arts history will undoubtedly remember that this was, perhaps, the original birthplace of the manual training movement.*

▸ *In his talk on "Competencies Needing Greater Emphasis in Education of Industrial Arts Teachers," Dr. John R. Ludington stated that man's hope today lies in the improvement of education. He went on to say that America must create learners who know how to use tools and knowledge of today, and who will search for truth throughout life.*

▸ *It was announced at the convention that the Ford Industrial Arts Awards Program will be under the sponsorship of the American Industrial Arts Association beginning this year. Anyone interested in application forms and other information concerning the awards program may receive a packet of material by writing to Kenneth Dawson, Executive Secretary, American Industrial Arts Association, NEA Building, Washington, D. C.*

▸ *The convention members standing in the lobby got a good laugh when Jimmy Durante, the famous comedian who was appearing at the Chase Hotel, began posing for some publicity shots with some of his show girls. He finally turned and said, "Why don't you take care of that industrial arts group?" Even Jimmy knew that the American Industrial Arts Association was meeting in St. Louis.*

▸ *A vote of thanks is in order to George Ditlow, convention director, Maurice Stewart, convention chairman, and Robert Swanson, general chairman, and to the rest of the crew who made this excellent convention possible.*

Wednesday

The first Wednesday morning program dealt with the question of in-service programs and supervision for the improvement of industrial arts teachers. Dr. David Taxis, consultant in industrial arts of the Los Angeles County Schools, presented a paper concerning the problems of handling in-service programs while Dr. John Lindbeck of Western Michigan University gave an authoritative description of a university program of in-service training.

The first major general session on the theme, "Our Changing Technology" took place on Wednesday afternoon. The keynote speaker for this occasion was Dr. James E. Russell, secretary to the Educational Policies Committee of the National Education Association. In his topic, "Our Changing Technology." Dr. Russell indicated his belief that the central value of all education was to foster that flowering of individual capacities which will enhance the quality of every person's life and enable every human being to become the best person he is capable of being. He pointed out that in today's changing society, we must provide the kind of education that will give each individual the greatest chance for a good life and fulfillment of his individual potentialities. This, he believes, is a difficult task in this rapidly changing technological age. The question of what knowledge and abilities are of value is difficult to identify. Dr. Russell feels that the ability to do rational thinking is of great importance. He believes that the contribution of industrial arts lies in the direction of students' understanding of emerging industrial techniques. Dr. Russell indicated his conviction that the best basis for an industrial arts program lies in the direction of understanding of industrial processes, since, as he pointed out, the role of industrial processes in our society is constantly expanding and will continue to expand. He feels that industrial arts can contribute greatly to the needs of students who come from less fortunate economic areas whose only real chance for improving their economic status lies in achieving a better education. For many, this means education in the area of industrial activities.

Thursday

On Thursday afternoon, the major topic was the question, "What Effects Should Technological Advance Have on Industrial Arts?" Dr. William J. Micheels, professor and chairman of the Industrial Education Department at the

associations

A detailed report on the important speeches and events of the 23rd annual convention of the American Industrial Arts Association —

Above: at the annual ACIATE yearbook breakfast, Dr. Ivan Hostetler receives the "Man-of-the-Year" award from Dr. Marshall L. Schmitt.

Right: Dr. Ralph C. Bohn, San Jose, Calif., State College, is shown receiving the first copies of the ninth yearbook of the group from Wes Stephens of McKnight and McKnight, the publishers.

Right: the Millersville, Pa., State College's exhibit.

Below: two of the convention's demonstrations.

University of Minnesota was the principal speaker. It was, indeed, appropriate that he should have been selected for this key address since the announcement was later made that Dr. Micheels was the newly elected president of the American Industrial Arts Association. Dr. Micheels first stressed the heritage of industrial arts and pointed to these important ideas:

1. Man is a toolmaker; without tools he can do very little.
2. Man is an environment changer; he is constantly making use of tools to change and control his environment.
3. Man is a machine-developer; he is a developer not only of mechanical machines, but also of the tools of information.
4. Man is a social animal; he must live with other people and he must live in an industrial civilization.

With this as a background, Dr. Micheels proceeded to characterize a technological society with six distinct points:

1. A technological society is characterized by an accelerated rate of change.
2. There is an emphasis not only on precision, but on even greater precision.
3. A technological society is experimental in nature and guided by imagination and bold vision of the future.
4. Technological society is practical and is concerned with those things that are useful rather than academic. It is more concerned with the application of knowledge to ways of life than with the cultivation of knowledge for its own sake.
5. A technological society is planful; it insists on the utility of design.
6. A technological society is dynamic, ever changing, and constantly seeking new and more efficient ways of doing things. Finally, Dr. Micheels raised several questions concerning the place of industrial arts in our technological society.

While these questions are too numerous to report in detail, some of the more thought provoking include these:

1. Does present industrial arts reflect the industrial civilization into which we are going?

(Concluded on page 48)

Industrial Arts Electronics for Televiewing

HOWARD H. GERRISH

▶ Utilizing closed-circuit and broadcast ETV in the same way in which other areas of the local district curriculum use it is essential to the vitality of industrial arts.

▶ Here is a report on an outstanding ETV series in I-A electronics broadcast for school and home viewing — with information on content, format, and techniques.

"Eddy Electron signs his contract for an extended television series," or the caption might read, "Industrial arts provides leadership in electronic education via television for school children and adults at home in northern California."

We write about this particular series because it may be of interest to teachers of industrial arts and science. While you may not personally have an opportunity to appear before the camera under the kleig lights, many of the ideas and results of television teaching have comparable counterparts in classroom teaching.

"Our Electronic World" was a weekly TV program for elementary and junior high schools — and for home viewing by parents, too. The program series was suggested by Garrett L. Starmer, TV production specialist and co-ordinator of television at Chico State College. The initial purpose of the program was an attempt to correlate television instruction with recently published texts on "Electricity" and "Electronics."* It was suggested that schools using the television instruction should also use the textbooks as a basis of discussion and evaluation. Students were encouraged to do the experimentation and project construction as outlined in their textbooks.

On preplanning conferences for the "industrial arts classroom on the air," it seemed wise to structure the programs around the discoveries and inventions of great scientists. In this manner, continuity in instruction from week to week was not so important. Students viewing the program might still understand the instruction without the benefit of previous lessons.

*Build-a-Course General Shop Series. Goodheart-Willcox Co., Chicago, Ill.

Dr. Gerrish is an assistant professor of industrial arts, Chico State College, Chico, Calif.

Content Schedule

The following program schedule will show the order of presentation and a brief explanation of the content.

I. *The Electron.* Presenting familiar experiments with static electricity using static machine, pith balls, and the electroscope. Laws of electrostatics were demonstrated.

II. *George Simon Ohm.* A biographical sketch of the life of Ohm with special reference to his inquiry into the relationship between volts, amperes, and ohms. Many experiments were performed involving Ohm's Law by the use of circuit boards and visual aids.

III. *James Watt.* The life and inventions of James Watt were explored. Experiments showed common uses of electrical power and methods of measurements. Consumer cost of power was explained. What is a kilowatt-hour? How does the meterman read your meter?

IV. *Country Roads and Freeways.* A study of series and parallel circuits by the analogy of traffic on the highway. Magnetic models of miniature cars were used to explain traffic resistance and movement.

V. *The Voltaic Pile.* The development of the voltaic cell from the experimentation of Galvani and Volta. What is inside of the storage battery and how should the car owner care for his battery? Why are cells connected in series or parallel?

VI. *The Lodestone.* The story of magnetism from the early Chinese navigators to the lodestone compass. A demonstration of the magnetic field around the earth. Magnetic field patterns were made by using iron filings. What is a solenoid sucking coil? An electromagnet? How is magnetism used at home and in industry?

VII. *Man's Servant.* The electric motor and how it works. How electrical energy is converted into mechanical energy. Familiar applications of motors.

VIII. *Michael Faraday.* The life of Michael Faraday and the invention of the dynamo. Demonstrations showed the performance of both d.c. and a.c. generators. A major portion of this program was devoted to a storytelling scene depicting the creation of electricity from magnetism.

IX. *The Edison Experiment.* The inventions of America's greatest inventor with special emphasis on the "glowing bottle" or the incandescent lamp. At this point the study of electronics was introduced by the explanation of the Edison Effect and space clouds.

X. *DeForest Adds the Grid.* A continuation of the Edison experiment by demonstrating grid control of electron flow. Introduction to the diode and triode. The birth of radio communications and the development of electronics. Many experiments, showing oscilloscope patterns.

XI. *Radio Waves.* What are radio waves? Why do they radiate to distant places in the world? How does your radio receive a radio wave? Oscilloscope patterns were used to show RF waves and modulation.

XII. *Your Radio.* A description of the radio by using block diagrams to explain the function of each tube. Resonant circuits and flywheel action of tank circuits were explained in the process of tuning the radio.

XIII. *Electricity and Music.* This was an extra program in the series and was scheduled just before Christmas. By use of the Hammond Organ, Christmas music revealed the opportunity to bring entertainment and pleasure to your home through electricity and electronics. Demonstrations included the operation of a microphone, the high fidelity amplifier, and the speaker system.

During all programs the safe use of electricity was explained and demonstrated. Our little character, "Safety Sammy" had many words of wisdom for the student and homeowner.

SAMMY SAFETY Says:

"Caution: When using the appliance cord type of wire, remember that each little strand of the wire is a conductor. Frayed wires, not properly connected, can make the sparks fly. It is the practice of a good technician to always coat the ends of a stranded wire with solder. This is called tinning. This keeps the fine wires in one group and allows you to make a good connection around a terminal."

Administrative Co-ordination

The following description of the series was sent to area school administrators and teachers before the productions were put "on the air."

"The study of electricity and electronics is not only for the scientist. An understanding of this force which has molded our civilization and raised our standards of living above any in the world, is a basic requirement of the well educated man.

"Electronics is one of the more fascinating and exciting sciences. In our television studies you will discover the common sources of electricity and many of the ways by which this wonderful gift of science is harnessed to make our working days easier and more pleasant.

"Continuing through the TV series, you will become acquainted with many of the great scientists in history; Faraday, Edison, Ohm, DeForest and others. You will learn about the contributions these men have made to the foundations of electrical and electronic knowledge. How does electricity make light and heat? Why does a motor run? How does my radio work? These and many other questions will be explored. You are invited to participate in our many demonstrations and experiments. These will help you to understand this mysterious power, called electricity."

Program Format

The format of the programs was based upon many experiments and demonstrations describing and proving electrical and electronic theory. Circuit diagrams were described and illustrated by visual aids — especially prepared by the college audio-visual center. Many circuits demonstrating series and parallel circuits, time delay relays, and photo controls were built up before the camera using appropriate breadboards and parts supplied by a commercial firm. The versatility of these parts provided ready-made experiments. Every effort was made to dramatize the science of electricity and the lives of great scientists. The Christmas program featured a Hammond Organ to which was attached an oscilloscope so that the audio pattern might be observed. The scope was also used to demonstrate harmonic tones, amplifiers, and microphones. To insure a continuing viewing audience, the programs were filled with exciting anecdotes, stories, unusual experiments, and dramatic presentation. On two occasions, students usually viewing the program at school, were invited to participate in the show. One day a young man and lady from a sixth grade were visitors. (Electronics teachers, don't miss those young ladies in your instruction!)

Dr. Gerrish is shown above "in action" during one of his telecasts of his electronics series. Below, he discusses production notes with Dr. Garrett Starmer, also of Chico State College. (The presentations were not filmed.)

Advantages of TV

Certain advantages may be claimed for television instruction. Some of these advantages can be also claimed by any imaginative and well-prepared teacher in the classroom. However, a brief review of these advantages will reveal that it would be unrealistic, if not physically impossible, for a teacher to make daily lesson preparations of the same quality as a well-produced and rehearsed television production of the same lesson.

During the "Our Electronic World" series, each half-hour program required an average of 12 hours preparation. Each experiment was carefully set up and its explanation was carefully considered. The sequence of instruction, the selection of words, and the use of audio-visual aids were carefully studied so that scientific information might be presented with clarity and effectiveness. Lessons presented with excellent preparation, as a result of definite planning and rehearsing, is clearly a major advantage of television teaching.

A second and more common advantage is the size of the student class, which in truth could be limitless. One well-prepared teacher, an expert in a particular field of endeavor, may present the television lesson to many students, insuring high-level, creative, and inspirational teaching. The "Our Electronic World" series was used in classrooms in several elementary and junior high schools in northern California. A secondary advantage, but still important, was the adult viewing audience of an estimated 20,000 housewives for each program.

The "Chico State Presents" program will continue over KHSL-TV, serving northern California with fine educational programs on science, philosophy, music, art, history, and industrial arts. The college is fortunate to enjoy the co-operation of the Golden Empire Broadcasting Co., and its radio and television facilities. The continued expansion of the program of television instruction and production is assured at Chico State College by the purchase of closed-circuit television equipment for next year and the construction of studios on campus.

▶ While the stress in woodworking today is on machine tools and processes, this author notes **the importance of hand tools and processes and indicates their place in the modern program in woodworking —**

The Importance Today of Hand Tools and Processes

RALPH W. ROGERS

Just a few generations back, craftsmen made their own hand tools to be used throughout their productive years in earning a livelihood. Later the same type of tools could be purchased over the counter manufactured by production methods. As demand for goods increased throughout the country and the world, machines were invented to do the work of several men using hand methods. For instance, there were saw mills to cut trees or logs into boards, planers to make these boards smooth and true as to thickness, machines to make nails, rolling mills to produce steel in all shapes, and forms ready to fabricate. The list could be endless.

Life has been speeded up and changed by factory methods of producing most everything we wear, use, and eat. We seemingly enjoy this life of speed and production because we associate it with progress.

Hand Work in the Factory

To many, the above statements seem to prove that hand methods need not be taught in this day when machines produce almost everything needed. Let us look in upon a production plant in this machine age and see what part hand tools and processes play in tooling for production and in keeping the factory running:

1. Most factories have an area devoted to experimental work, which is going on continuously, or have a maintenance department where most repairs and replacement parts are made.
2. In many plants all small orders, too small to profitably be put into production, are made by hand with the help of small machines.
3. Every piece of production is made singly many times before being accepted for quantity runs.
4. All casting patterns or shapes and all dies for the tool and die trade are made entirely by hand.

Need more be said to show that all production starts with hand tools and hand processes?

The Point of Beginning

Today in the school shop, where boys come in with little or no knowledge of tools or tool processes, there can surely be only one place to begin instruction — that is, with the simplest hand tools that can be used to fashion ideas into useful small projects. These need to be small and of few parts so that completion can come quickly. The student requires this early project to give him confidence and interest in accomplishment. His sole desire is to see the completed project and to take it home.

Mr. Rogers is an instructor of industrial arts at the Lakeview High School, Decatur, Ill.

The teacher's struggle now begins. What degree of perfection must be demanded in each individual and how best to demand this, so that initiative will not be destroyed. Only experience can give the best solution. Some demand that a new start must be made when the project falls below the teacher's standard. Others change the design somewhat to eliminate the error in size. Others force the student to remove the finish and prepare the surface to standard. (This is the student who operates on his own standards.) These small and simple projects can be made at a single station with each student having his own individual tools to a considerable degree. This makes for greater progress and allows for individual differences and speeds.

When referring to hand tools the basic cutting and layout tools are meant. All of these tools have many interesting facts about them that call for much study and research. These facts must be taught if you, as a teacher, wish the student to have respect for all tools and to know when the tool is properly sharpened. Easy access to sharpening areas must be provided and complete facilities must be provided for tool conditioning. (This is a teacher responsibility.) Many teachers fail to consider that the properly sharpened keen-edged tool is the secret of fast, accurate, and safe work. Dull tools require excessive pressure and thereby cause a student to lose control of the tool, with too often a casualty resulting.)

In a discussion of hand tools and processes, a great deal needs to be discussed about the proper usage and sequence. In other words, each tool was made to do well one or more operations. Some are roughing tools and others are finishing tools. Still others are for special shapes and flat surfaces. In teaching proper usages, we teachers need to give considerable planning time to demonstration on what happens when we fail to use the proper tool for the job at hand and fail to use it properly. Many teachers feel that they have fulfilled their obligation when they demonstrate the proper usage. It is advisable to go one step more and point up what happens when the usual procedure is bypassed.

In Summary

One of the chief reasons for teaching hand methods in woodwork is to instill within the student the idea that he can, at some later time, create a desirable object with a small outlay of money for tools as opposed to a student solely trained on power-driven equipment and a feeling that he cannot do the job because he does not have the equipment with which to work. In beginning metalwork and the crafts, hand work is the natural starting point and most projects fall well within the hand tool classification.

If you have been inclined to neglect the teaching of the hand tools and methods, I hope that you will think carefully as you plan the future for the students yet to come. ◀

How to Evaluate and Obtain I-A Teaching Positions

MITCHELL SALIM

▶ A checklist of (1) how to obtain information about teacher vacancies and (2) how to evaluate your suitability for specific openings — to use as a guide toward basic factors which may indicate success or failure —

The following points have been developed through experiences encountered while negotiating for teaching positions and while being employed as an industrial arts teacher. While there are many ways of securing and evaluating industrial arts teaching positions, the intent is to provide you with some basic factors for your consideration so that you may develop an understanding of the various facets of this problem.

I. Information About Vacancies

A. *State Placement Centers*

Somes states maintain teacher placement services and without fee. Write the various state educational departments.

B. *State Teacher Associations*

Some state teacher associations maintain placement services, usually at a fee of 2 to 3 per cent. For information, write the teacher association headquarters of the state in which you are interested.

C. *Private Teacher Agencies*

These agencies usually carry advertisements in teacher association magazines. The usual fee is 5 per cent of the first annual salary. Some agencies provide local service only while others provide service on a national scale.

D. *College Placement Bureaus*

Most colleges provide a free placement service. These bureaus may also serve as a source for the retention and forwarding, when needed, of your file of credentials.

II. Negotiation With Representatives

A. *Receipt of Information on Vacancy*

After you have received information concerning the vacancy, it is advisable to write a letter of inquiry to the appropriate administrative officer responsible for filling the position. This letter should include the following thoughts:

1. Inquire as to the existence of the particular position.
2. Request information concerning the vacancy.
3. State your particular interest or interests.
4. Give a brief description of yourself; such as:
   - *a*) Age, marital status, and number of children.
   - *b*) Educational background.
   - *c*) Past teaching, industrial, and military experience.

B. *Reply from School Administrator*

If a favorable reply is received from the school administrator that he wishes to discuss the vacancy further, then an interview should be arranged. This is usually requested by the administrator.

C. *The Interview*

The attitude which you convey during the interview should be professional in manner. This means that it is your responsibility to answer and ask questions which will affect your performance in the position. The interview, on your part, should be positive in approach but yet not aggressive.

While the administrator is interviewing you, you in turn, should seek the answers to questions concerning the community, the school board, the general school policy, and the industrial arts program. Some important questions to ask would be:

1. *The Community*
   - *a*) What are the economic characteristics of the community?
   - *b*) What is the general community attitude toward industrial arts?
   - *c*) What are the cost of living factors of the community?
2. *The School Board*
   - *a*) How important a role does the industrial arts program play in the total school curriculum as envisioned by the school board?
   - *b*) To what extent is the school board willing to support a stronger industrial arts program if the need is indicated?
   - *c*) Does the school board contain members who are employed or active in industry?
3. *School Policy and Procedure*
   - *a*) Class schedule, and average number of students per class, for industrial arts teacher.
   - *b*) What, if any, are the extra class duties?
   - *c*) What is the policy on student promotions and failures?
   - *d*) Does the school have a policy on undesirable student behavior; if so, what is it?
4. *Industrial Arts Program* (The industrial arts shop should be carefully inspected during this visit.)
   - *a*) What was the length of service of previous teacher, and why did he leave?
   - *b*) What was the average industrial arts budget over the past three years? Can this amount be increased if warranted by program development?
   - *c*) What comments have been made by the state bureau of industrial arts?
   - *d*) Are periodic conferences between the teacher and responsible administrator held?
   - *e*) Is the teacher consulted concerning selection and purchasing of materials and equipment, including books, for his instructional area?
   - *f*) Is sufficient time available during the school day for shop maintenance and improvement?
   - *g*) Is the industrial arts teacher expected to perform general school maintenance and repair work as an unpaid duty?

Mr. Salim is an instructor of industrial arts at the Adam Center, N. Y., Central School.

h) What is the administrator's opinion of the current industrial arts program?

5. *Salary and other Factors*
   a) Is credit given for past teaching experience, past industrial experience or military service?
   b) Does the salary schedule include provisions for graduate credit hours beyond the bachelor's degree?
   c) How does the salary schedule compare with other nearby school districts?
   d) If you are to be hired over your actual schedule step, what amount of increment may you expect in the future?
   e) What percentage of the staff is on tenure?
   f) Is additional compensation available for time spent during the summer for shop preparation and improvement?
   g) What is the sick leave policy?
   h) Does the school district contribute toward group hospitalization insurance?

It is usually to your advantage to let the administrator make the offer of salary to be paid. Compare this salary amount with that being paid in the nearby area for the same instructional area, and for a person of similar background. Salary schedules only set minimums for each step. There is nothing to prohibit a school district from paying more than is stated in the salary schedule for a specific step.

D. *Final Decision Concerning Vacancy*

At this time, you should have received a letter from the administrator indicating his interest in you. If the letter is receptive, it should contain a definite offer. If you are satisfied with the offer, you should then write a letter of acceptance. In return, you will receive a form stating your salary, your date of appointment, and the conditions of the appointment.

If you have received a receptive letter and are not satisfied because of salary or other problems, write a letter to the school representative indicating your requirements. If a satisfactory reply is not forthcoming, and your views are unchanged, then you should indicate your withdrawal as a candidate.

III. Summary

The preceding list contributes a list of some of the factors which may affect your performance in a teaching situation. By obtaining information on these factors, in advance, you will help to eliminate future problems which could be of a definite handicap to you

It is important that you do not panic during an interview, and either hastily accept or reject a position. Acceptance or rejection of a position should come only after careful evaluation. Changes of personnel are constantly occurring in the teaching profession. If the results of one interview are not satisfactory to you, then by all means explore other industrial arts vacancies. ◀

DESIGN for the TEACHER

john r. lindbeck

Associate Professor of Industrial Education, Western Michigan University, Kalamazoo, Mich.

▶ Another in this series on **applying design to teaching situations** . . . this one on the **role of function** —

Design Guideposts— Function

All of the projects featured in this series have been developed according to five frequently mentioned phases of a design analysis method; these phases or steps are (1) the statement of the problem, (2) analysis and research, (3) possible solutions, (4) experimentation, and (5) final solution. Briefly, the process of designing according to this method involves (1) defining the nature of the problem carefully, (2) asking questions about the project or product (where and how it is to be used, what materials, etc.), (3) preparing sketches of some possible solutions to the problem, (4) undertaking any experimentation, and (5) preparing a working sketch of the selected solution. The design analysis method provides a logical blueprint to follow in undertaking any design activity.

In order to clarify and simplify designing, certain guides can be established. In the analysis and research phase, for example, some thought must be given to some of the requirements of the design problem. These requirements can be considered in terms of questions asked about the contemplated product, questions regarding use, size, proper materials, and so forth. Satisfactory solutions to design problems, however, call for a movement beyond these questions. One must, in the sketching phase, examine the visual essentials of the problem in order that the product will not only work, but also look well. Good design, then, demands that one provide answers to questions regarding the *functional*, *visual*, and *material requirements* of the product or project. Due consideration should be given to some of the ramifications of these topics, for they can serve as invaluable guides to the design process.

Functional Requirements

The project or product should fit the purpose or need for which it is intended. In other words, the well-designed article works as it should. The can opener which fails after opening the first metal container, the

tie rack which permits ties to fall to the floor, the chair which does not adequately or comfortably support the human frame — all these are examples of poor design. The designer must expend a good deal of effort in insuring the efficiency of operation in the products he designs. When designing a desk chair, the designer must either consult a reference book containing anthropometric data — the statistics of human measurements — or secure the bodily dimensions of the person for whom the chair is intended. For the chair to be functionally correct, it must fit the human frame comfortably. Efficient performance then, is one dimension of this criterion of function.

A second important dimension of function grows out of the first: time. How long should the product function? Should the can opener open cans forever? Should a light switch remain operational for one hundred throws? Five hundred? Five thousand? This question should be answered in the statement of the design problem. Designing is *planning* to meet a specific need. If one is planning to meet the requirements of an electrical switch good for five thousand throws, he must comply with this need, or the design is poor. The specific requirements of the design task at hand will be the controlling factor for this second dimension.

Illustrations of Good Designing

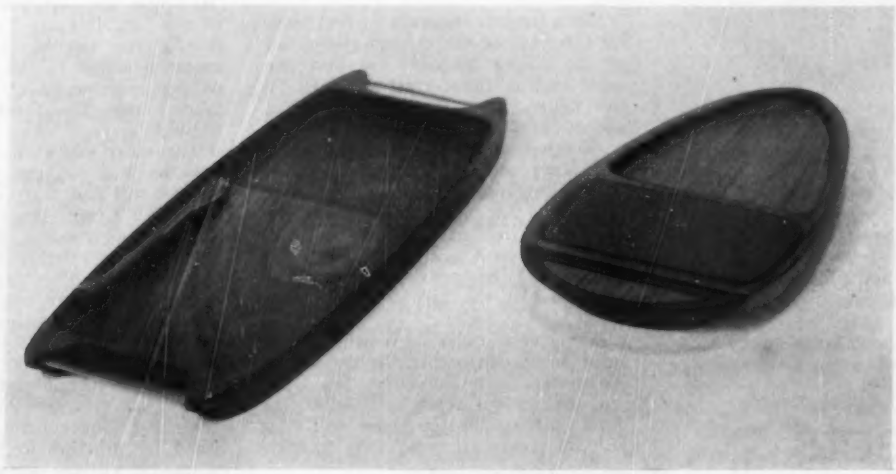
An outstanding example of a product designed with function in mind is the illustrated plastic bottle. This container for a household bleaching solution features a handle which functions as a handle should. It fits the hand comfortably, makes pouring easier, reduces the possibility of dropping the bottle when it is grasped with wet hands, and, in addition, has a very interesting form; it literally invites one to pick it up. The form, in effect, has followed the function. Moreover, an excellent material was employed in its manufacture; the light plastic bottle ends the problem of breakage. This solution to the problem of designing a container for liquids is a great improvement over the familiar heavy jug which requires that it be carried with only one finger.

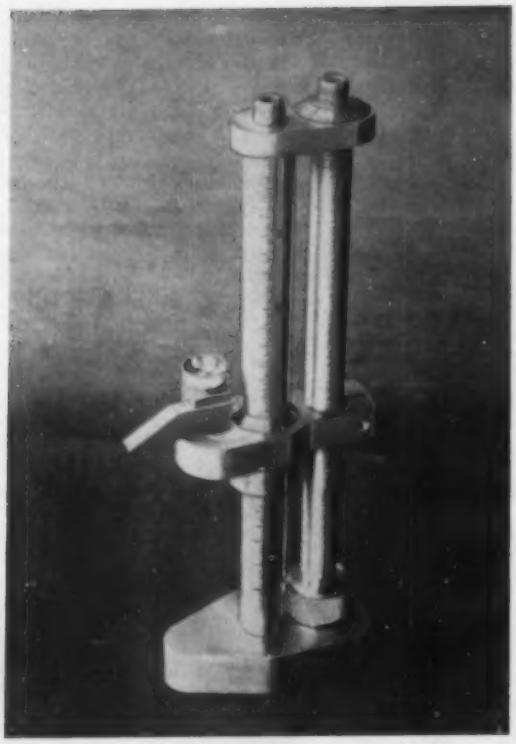
In like manner, the cutting boards in the photograph have certain functional characteristics. Notice the provisions made for picking up and carrying the boards; in one case, a brass rod spanning two projections on either end, and in the second example, a slight undercutting of the edges. The methods devised for securing the cutting tools in place are ingenius; the knife blade is held by hidden magnets, and the cutting bow is held by a closely fitting center piece. In each board, the routed-areas provide functional containers for hors d'oeuvres.

There lies a certain danger in oversimplifying or overemphasizing the role of function in design. A product, as a response to a given need, may be perfectly adequate from the functional standpoint but fail to be appealing to the senses. For example, assume that someone needs a container for flowers. A tin can may function perfectly well for this purpose, but it is hardly suitable for the dining room table. A fine ceramic vase, or a delicate glass bowl would be far more appropriate. This is simply to say that functional sufficiency is no guarantee of good design.

In any number of useful products, function does not dictate form, it merely indicates form in a general way. The role of the designer here is to select from a variety of possible contours, each of which may be functionally and materially correct, that form which is esthetically most satisfactory. He does not unnecessarily embellish or elaborate or enrich, but instead refines and simplifies and perfects. The key to the wise and proper employment of this element of function is in the designer's recognizing that the question, "what is it to be for?" must be coupled with, "where and how is it to be used?" Significantly, this leads directly back to the necessity of clearly defining the design problem. ◀

— Roman Cleanser Co.





BUILDING A HEIGHT GAUGE

PAUL N. HOLSINGER
Instructor of Industrial Arts
San Jose, Calif., State College

In order to challenge the advanced machine shop student in a vocational school, high school, junior college, or college and to give him further experience with precision machining and fitting, especially in spacing, the height gauge illustrated in the accompanying material has been developed. Its capacity is 6 inches, which means that it is suitable for the majority of jobs to be measured in the school shop.

Operation and Reading

The theory of operation upon which the gauge is based is simple: the column is calibrated into 20 divisions per inch; therefore the screw is cut twenty threads per inch. The dial on the top of the screw is divided into 50 spaces, each space equaling one thousandth of an inch.

Measurements are taken by first reading the scale on the column at the top of the sliding bushing; the last line unexposed is the correct reading. To this figure the reading of the dial is added. For easiest reading, the dial is situated at the top of the screw and fitted with a taper to allow for adjustment and to provide a fastening for securing it on correct location. The knurled section of the screw is conveniently located near the base for easy adjustment; the operator's hand will be positioned at the base to operate the gauge.

To achieve rapid movement of the head from one setting to another, a socket head wrench may be used. Driving the bottom screw will lower the head; driving the top screw will raise it. This prevents any possible loosening of the screws.

Construction

The top plate, sliding head, and base should be machined and ground to thickness, then clamped and bored at one setup to assure the same spacing on the three parts, as well as to assure smooth operation of the head when assembled. If they are stacked with the sliding head on top, the base in the middle, and the top plate on the bottom, all three right side up and bored and counterbored from the top, all strategic bores will be finished except one. The .625 counterbore in the top plate can be done in a lathe with a faceplate setup. The ⅞-in. diameter counterbore in the base is not precise and can also be done in the lathe; but before it is removed from the milling machine, still located over the hole for the screw, the thread must be started with a tap; this can be done by supporting the top of the tap with a center mounted in the spindle of the milling machine. After this setup is taken down, the thread is carefully finished.

The outer edges of the three parts may be laid out and machined. The student will find that the use of trammels with a short beam will serve well in laying out a radius whose axis is the center of an existing hole. A suitable finish on these outer surfaces consisting of straight sections and curves can be obtained by using emery cloth under a file; this technique is especially adaptable for blending tangents.

Both the column and screw are machined on centers; this assures concentricity. The column should be finished by grinding or lapping so that a smooth working surface is provided;

projects

Bill of Materials

Quan.	*Item*	*Size*
1	Machine steel	¾ D x 7½"
1	Machine steel	1 D x 8"
1	Machine steel	¾ x 1⅝ x 2⅞"
1	Machine steel	⅝ x 1¼ x 2¼"
1	Machine steel	⅜ x 1⅛ x 1⅞"
1	Machine steel	⅞ D x ⅛"
1	Machine steel	⅝ D x 1½"
1	Machine steel	⅝ x ⅝ x ⅝"
1	Machine steel	1 D x ⅛"
1	Spring brass	20 ga. ¾" D
1	Shaper tool bit	¼ x 5/16"
4	Socket head cap screws	¼-20 1"
1	Socket head cap screw	8–32 ½"
1	Bushing	Excello No. L-833A

it must also be without taper. The ends must be ground square with the body so that, when assembled, there will be proper alignment.

Cutting the screw must be done with great care. Size, finish and straightness (no taper) of the thread are essential in order to facilitate smooth operation. The stock, therefore, should be sawed to rough length; in a lathe, using a steady rest face to length, the holes are drilled and tapped, and the center holes carefully prepared. It then must be set up between centers, rough turned, knurled, and finish turned; end surfaces must be faced and the important thread cut last.

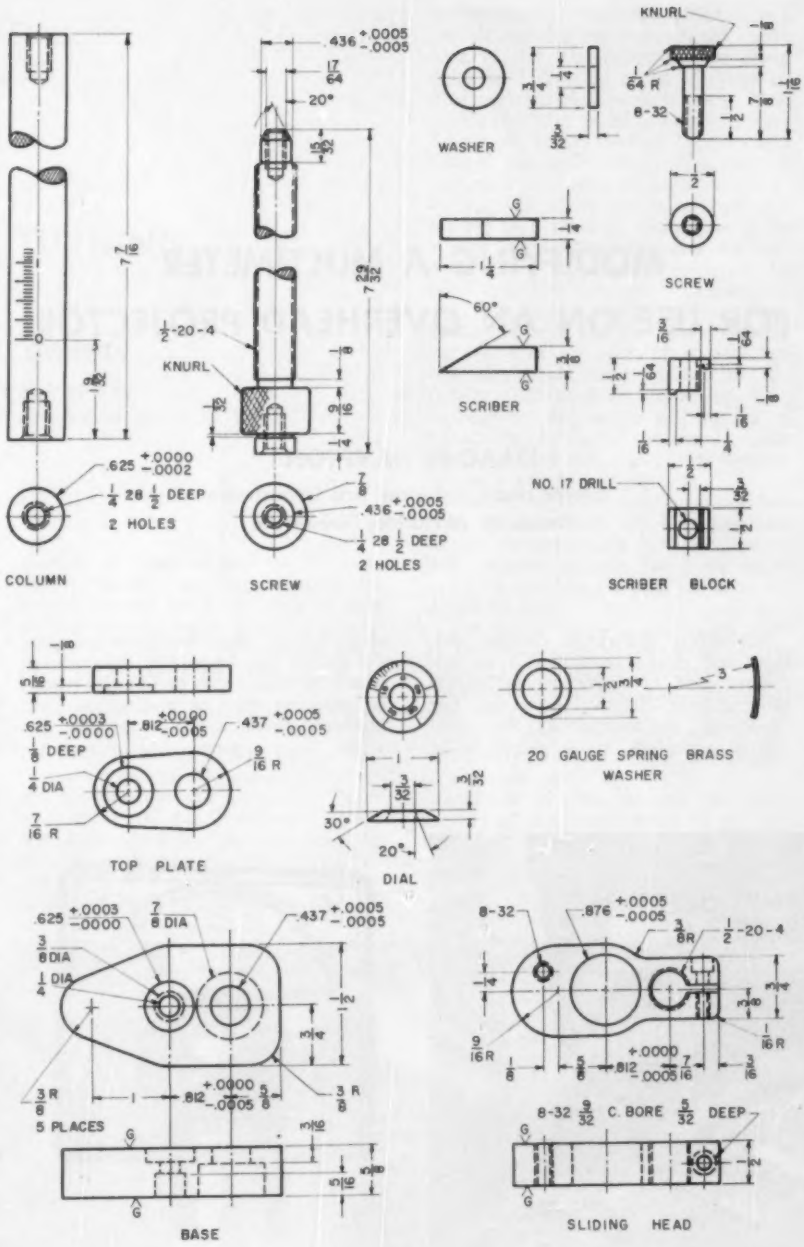
A spring brass washer on the bottom end of the screw installed under a solid washer guarantees anti-end play and a high degree of accuracy.

The screw for the scriber block and the dial are made in the lathe, except for the calibrations; the calibrations on the dial can be cut in the milling machine by using the dividing head; those on the column can also be cut in the milling machine, using the screw for spacing. In order to maintain the high standard of quality throughout, which the height gauge requires for accurate measurements, the letters on both parts should be engraved.

The scriber block can be machined either on the shaper or on the milling machine. If the student is concerned with improving its appearance, he may grind it on the outer surfaces.

Avoid Complications

Heat treating of the parts, namely base and sliding head, has been avoided in order to minimize complications; distortion by warping and shrinking would destroy the center distances, rendering the parts unusable. Only two parts are hardened: the bushing and the scriber. The bushing, which can be purchased, is a standard drill bushing; the scriber is ground from a ¼ by 5/16 in. shaper tool bit. It is, therefore, unnecessary to do any heat treating in the school shop for this project.



Learning Experiences

Students who are ready for a project of the degree of difficulty offered in the building of this height gauge will have an opportunity to learn precision machining in the lathe, shaper, and milling machine. Cutting of the screw thread in itself is a challenge. Calibrating of the dial and column also lends opportunity for the student to learn additional operations of which the milling machine is capable. Cylindrical grinding of the column and surface grinding of the several flat parts give the student advanced experiences in developing fine finishes and precise dimensions. Boring and counterboring of the top plate, sliding head, and base to obtain smooth finishes and accurate sizes affords the student valuable experiences. Hand finishing of the outer surfaces to a satisfactory standard employs a technique all advanced machine shop students should experience. When all the parts are made, the student can then assemble the gauge and grow in self-confidence as he sees his own machined parts fitting with operative precision. Lastly, he may set the dial to read accurately when the gauge is adjusted to a gauge block.

MODIFYING A MULTIMETER FOR USE ON AN OVERHEAD PROJECTOR

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Adequately illustrating current, voltage, and resistance values is an important part of many demonstrations showing basic electrical principles. For classroom demonstrations, the voltmeters, ammeters, or ohmmeters to be used must (*a*) be of larger-than-average size so they may be read by the students seated farthest away, or (*b*) the teaching situation must be modified so that smaller groups of students may view the action from a range close enough to permit using meters of normal size.

Since the cost of large-face meters was found to be prohibitively high, and it was also desired to keep all students seated throughout the entire lecture-demonstration, the following scheme was devised to circumvent this problem:

1. A multimeter kit, covering the most used ranges, was obtained and wired according to instructions. A multimeter was selected to enable voltage, current, and resistance measurements to be made using only one instrument, thus reducing overall costs.

2. The meter movement was not installed, but was left separated from the case. A cover plate of ⅛ in. acrylic plastic was installed over the hole where the encased movement was designed to fit.

3. Two banana jacks were mounted in this cover plate, and the internal meter leads soldered to these jacks. The jacks were color coded for correct polarity.

4. Flexible leads about 30 in. long were used to connect the detached meter movement to the case so that normal functioning could be achieved. Spade lugs were used on the meter end and banana plugs on the case end of these leads.

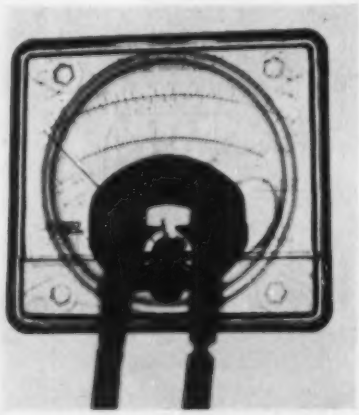
5. Since the meter movement is completely encased in transparent plastic, it can be placed on the stage of an overhead projector and a greatly magnified image thrown onto a screen. The one problem remaining was to make the meter scales transparent.

6. To do this, a photographic positive was made of the calibrated meter scale. This positive was made on transparent acetate film, the exact size of the original scale. Since part of the meter calibrations were printed in red, and the rest in black, the above positive was used as a master to transfer two diazo process transparencies — one on a red image film and another on black image film.

7. These two parts of the scale were then trimmed for proper register, and attached to the under side of the meter bezel, after first being carefully aligned to correspond to the identical position in relation to the meter needle as was the original scale. These transparencies were fastened in place with transparent cellulose tape.

If desired, a base of clear acrylic could be fabricated which would allow more rapid positioning of the movement prior to projecting the image. The image size was 2 by 3 ft. which is adequate for any except a very large lecture audience. It is seen that only the bottommost scales are unusable, being covered by the shadow of the opaque horseshoe magnet.

This modification has enabled all students in a lecture class to observe significant meter action with complete ease and without the necessity of leaving their seats to obtain accurate, close-up readings. No impairment in the normal functioning of the instrument has been detected due to the alterations just described. ◀



TEMPLATE TURNING

ALBERT W. DANIELS
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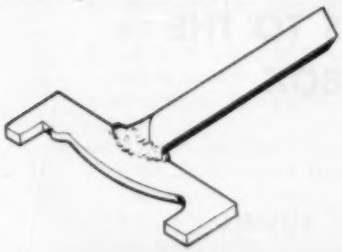
Eastchester Junior High School, Mamaroneck, N. Y.

Template turning is probably not a new technique to many of you, but it may prove to be a welcome answer to problems many of us have in getting junior high school students to turn a number of small objects to the same size and shape. Template turning is also a good method for introducing an area dealing with the mass production techniques of industry, which should be a part of any industrial arts course of study.



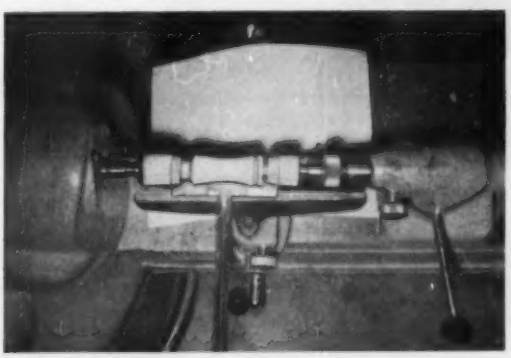
Last year while substituting in a general shop the author came upon the following problem. A boy had started to make a pair of salt and pepper shakers for his mother's collection. After many futile attempts to make the second one look anything like the first, he became very dejected and wanted to quit.

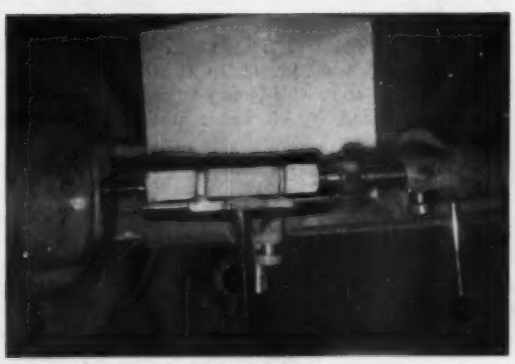
The problem was solved in the following manner. The boy could turn a perfect cylinder. He was assigned, therefore, to the job of turning two dozen cylinders each to be 1½ in. in diameter. This he proceeded to do at once. That afternoon after school, in about two hours, the author welded together and shaped the first cutting template. It was made of a piece of band iron ⅛ in. thick, 1 in. wide, and 6 in. long and welded to a piece of angle iron ½ by ½ in. The shaping was done by first marking the shape to be made on the band iron. This was done with a scratch awl. Next several rough cuts were made with a hack saw and then the final shaping was done by mounting an old but still serviceable emery wheel on the grinder. The band iron does not hold an edge for any length of time but it was enough to enable the boy to make several sets of salt and pepper shakers before it required sharpening.

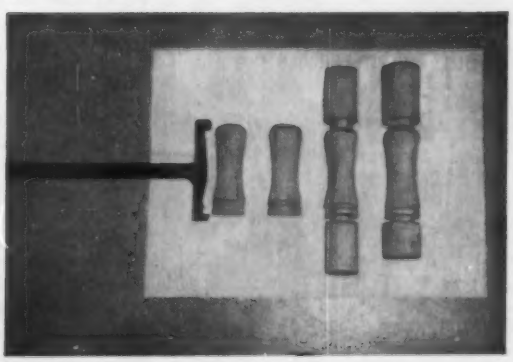
The cutting template of band iron has been discarded but the idea has not. As the accompanying pictures show, a new template of tool steel was made and it is now in use and will soon be joined by many others.

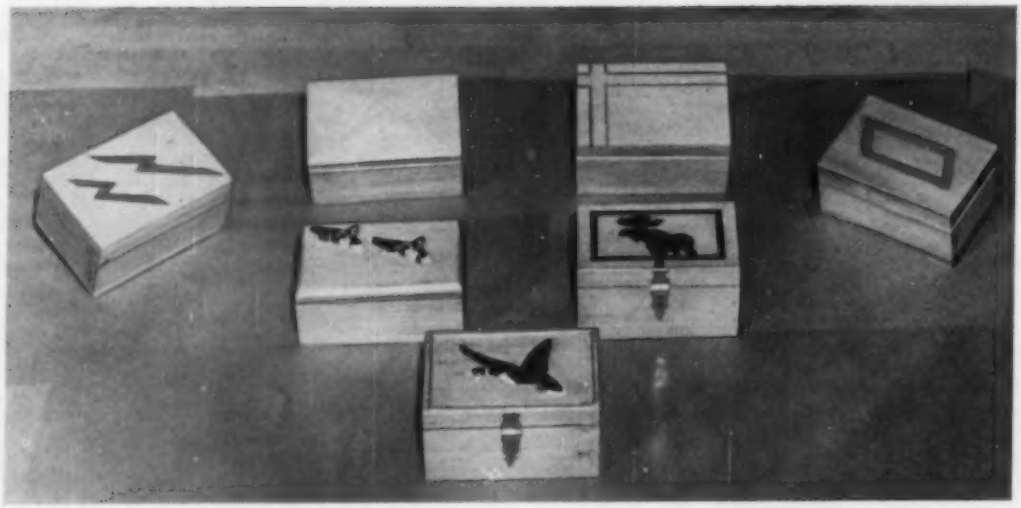
The use of this tool is limited only by the imagination of the instructor. In a senior high school shop program where the materials and equipment are available, the students might even be required to make their own tool in the metal shop and then turn the object in the wood shop.

I should like to add that the boys are not generally permitted to use the template turning tool until they have completed at least one project that requires the use of standard lathe tools. ◀









APPROACHES TO THE JEWEL BOX

SHERWOOD C. RUSSELL
Instructor of Industrial Arts
McKinley Junior High School, Appleton, Wis.

We find that this is an ideal first project in woodworking for our ninth grade. Most of the lumber was collected as scrap from the previous year with this project in mind. The total cost for such a project is almost incidental.

The sizes of the box may vary depending somewhat on the use one has for it. Some boys interested in fishing have used them as fly boxes.

This type of project affords the review of many of the various tools and acquaints new students to the various uses that can be made of tools with the ultimate results of a finished project.

BILL OF MATERIALS

Quan.	Description	Material	Size
2	Ends	Pine or basswood	⅝ x 2⅛ x 3¼"
2	Sides	Pine or basswood	⅝ x 2⅛ x 6"
1	Top	Pine or basswood	⅛ or ⅝ x 4¼ x 6¼"
1	Bottom	Pine or basswood	½ or ⅝ x 4¼ x 6⅛"
2	Box hinges	Brass	½₂ x ½ x ¾ or 1½"

Procedure

1. Select end and sides and plane to 2⅛ in. Be sure both sides are parallel.
2. Square one end with try square, then measure over 6 in. and square that end.
3. Square one side with try square, then measure over 6 in. and square that end.
4. Sand the outside of the boards so they are perfectly smooth.
5. Glue both ends.
6. Place the sides on the outside of the ends forming a perfect box.
7. Use handscrew clamps and try square to tighten and square box—brads may be used, if necessary.
8. Leave in clamp 24 hours or until thoroughly dry.
9. Select top and bottom out of ½ in. stock.
10. Finish top and bottom by sanding and planing board to within ⅛ in. of size of glued box.
11. If framework of two sides and two ends does not sit level take full sheet of sandpaper and sand both top and bottom so they are level.

12. Next day glue top and bottom to framework of box allowing ⅛ in. overhang all the way around.

13. Wipe off any excessive glue with wet towel after each gluing process.

14. Sand edge of top and bottom that overlaps box so it is flush all the way around.

15. Resand any surface that might have gotten dirty in the process of handling.

16. Measure a line ⅞ in. down from top all the way around the box.

17. Use a band saw or buck saw to saw box in two, staying as close as possible to line.

18. Sand both surfaces that were sawed on full sheet of sandpaper so they are smooth, and closed tightly all the way around.

19. Put one of four designs on top.
    a. four-way taper.
        1) allow ⅛ in. above glue joint of boxtop and the box itself for taper
    b. inlay with contrasting color wood.
        1) use straight line design preferably
        2) use 1/16 in. veneer of mahogany or walnut
    c. hand carve an appropriate design.
    d. wood putty and food coloring.
        1) select an attractive design and engrave to depth of at least ⅛ in.
        2) fill small baby food jar with few drops of water
        3) add drop or drops of food coloring in water — more drops the darker it becomes
        4) darker doors show up better on tops
        5) add wood putty to consistency desired
        6) fill in design making sure all area is filled
        7) wood putty should be above surface on top
        8) leave 24 hours or more for complete drying
        9) sand wood putty level with the top of box — be sure sanding is done with the grain
        10) use contrasting colors

20. Apply finish.

21. Place box hinges on box ¾ in. from each end.

22. Use escutscheon pins ⅜ in. long.

23. Brass plated hasp may be put on front if so desired.

24. Flock the inside of box with hand flock gun.

25. We try to match inside color flock with color on outside of box.

26. Mask tape area where top and bottom meets so paint and flock will not stick to it. ◀

THE SERVER

DAVID L. WATKINS

Director of Industrial Arts
Swarthmore, Pa., High School

Here is a very nice server like the Early American baler and scoop. It is a good project to use in teaching your advanced students to cut compound angles on the power saw.

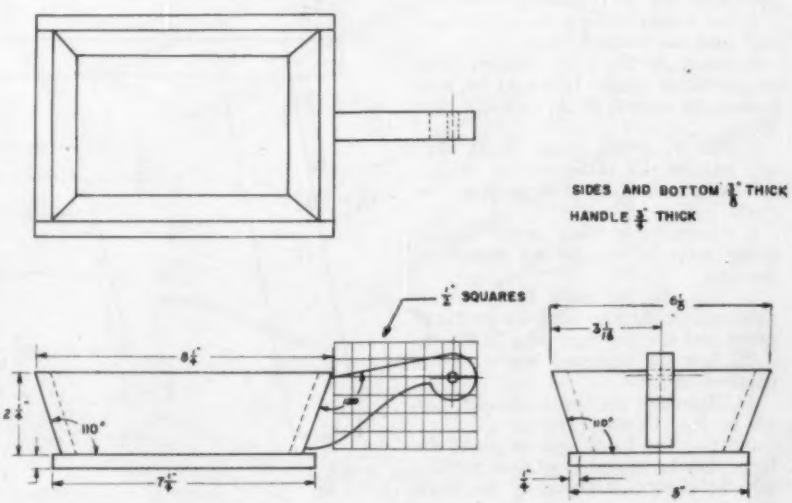
The miter gauge was set at 20 degrees and the saw blade tilted at 6½ degrees. The sides must be reversed as they are cut so the 6½ degree angles will be in the same direction when the server is assembled.

The sides and bottom were put together and fastened with glue and wire brads. The pieces should be sanded and stained before assembly so the glue which is squeezed out will not seal the pores of the wood as the server is being assembled. After setting the nails below the surface of the wood and filling the holes with plastic wood, sand again with fine sandpaper, rounding all corners and then the restained areas needing to be touched up.

The handle was cut out on the jig saw, sanded, stained, and fastened to the server with brass screws.

After allowing the touched up spots of stain to dry overnight, the server was given two coats of white shellac (rubbed with steel wool between coats), and then waxed and polished with a good paste wax.

The leather thong was inserted through the hole in the handle and tied with a square knot. It adds a decorative touch and can be used to hang the server on the wall when the piece is not in use. ◀



BUILDING A SAWHORSE

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Retired Head Supervisor of Vocational and Practical Arts
Los Angeles, Calif., City Schools

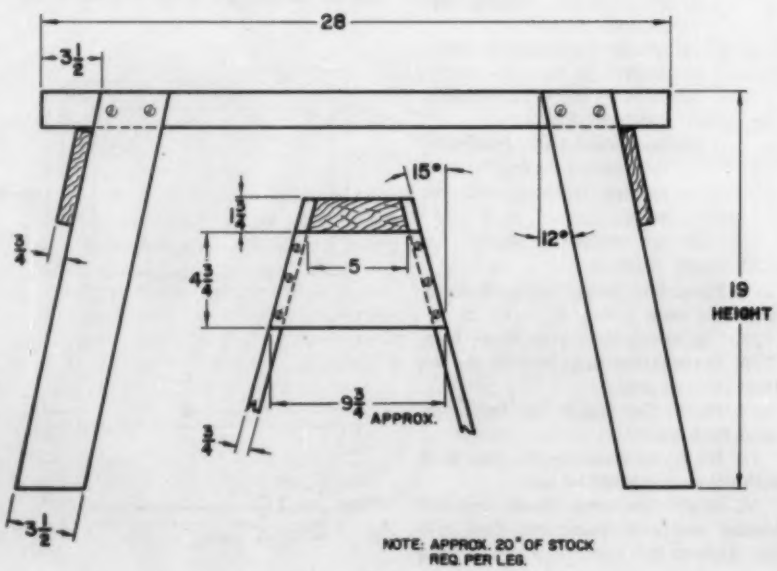
Every school and home workshop needs a pair of rugged sawhorses that have stability and are of simple construction. The one shown here meets these specifications. The legs have a two-way spread which gives stability without the usual difficult task of dapping the legs into the top at an angle. The entire job can be milled out on the circular saw and the jointer.

This sawhorse was originally designed for the elementary schools. Hundreds were sent out in knockdown form and assembled at the schools for industrial arts use in classroom situations.

Procedure

1. Mill out stock to net size for the two tops.
2. Mill out two pieces to net thickness and width for the legs, each piece long enough for four legs plus a few inches for sawing.
3. Mill out one piece of stock to thickness and width long enough to make the four end braces.
4. Tilt circular saw blade at 15 deg. and rip bevels on the two tops allowing waste strips to fall loose on the outside of saw blade to avoid kickback.
5. Set jointer fence at the same angle and joint the beveled edges.
6. Screw ¾ by 3 in. wooden strip on the miter gauge. It should be long enough to extend 26 in. past the saw blade.
7. Set the miter gauge at 12 deg. and with the saw blade tilted at 15 deg. saw off one end of each piece of leg stock.
8. Clamp a stop block on the wooden gauge strip at the desired length of the legs.
9. Slide the leg stock from left to right against the stop block on the miter gauge and saw the eight legs to length.
10. Saw the four end braces to the required angle.
11. Assemble the two sawhorses. Use 1½ in. No. 10 wood screws.

NOTE: The height and length of the horse may be increased without modifying the design or changing the work procedure.



PLASTIC BOX

ALVIN R. LAPPIN
Associate Professor of Industrial Arts
San Jose, Calif., State College

Here is a box which may appear, at first sight, to be far too advanced for the beginner. However, by careful analysis, and simplification of design, it has been brought well within the beginner's experience with plastics.

Procedure for Making the Box

1. Select and saw material to size.
2. Pair off top and bottom, sides, and ends.
3. Fasten each of these pairs face to face by using mucilage or library paste on the masking paper.
4. Round off top corners of the pair of ends as shown in the plan.
5. Sand and buff all edges of the ends.
6. Sand and buff only the long edges of the pair of sides; and the paired top and bottom. (NOTE: Do not work ends at this time.)
7. Cut a groove 1/16 in. deep, 1/8 in. wide on the outside surfaces of the paired top and bottom, and 1/8 in. from the edge as shown in the plan.
8. Cut a groove 1/16 in. deep, and 1/16 in. wide across the outside surfaces of the sides at the center position.
9. Remove masking paper from all parts, except the center partition, keeping all parts in their original matched position.
10. Cement sides into grooved bottom with partition grooves, at center position of sides, located on inside of the box.

Bill of Materials

Quan.	*Description*	*Material*	*Size*
2	Top and bottom	Clear acrylic plastic	1/8 x 2 3/4 x 5 13/16"
2	Ends	Colored acrylic plastic	3/16 x 1 3/4 x 3"
2	Sides	Clear acrylic plastic	1/8 x 1 1/8 x 5 13/16"
1	Center partition	Clear acrylic plastic	1/16 x 1 x 2 3/8"
1	Flower petal	White translucent acrylic plastic	1/16 x 2 1/2 x 3"
1	Leaf	Clear acrylic plastic	1/16 x 1 1/4 x 2 1/2"
1	Stamen	Clear acrylic plastic rod	3/16 dia. x 2"

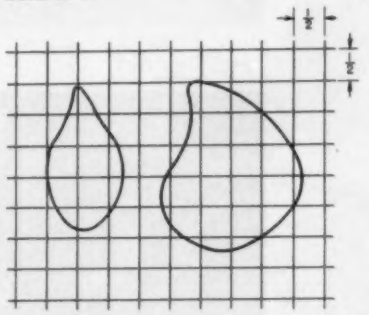
11. After bottom and side joints have hardened, sand the ends of this assembly square and smooth.
12. Cement ends in place.
13. Sand and buff the ends of the box top so it will fit the box.
14. Fit the center partition to the box.

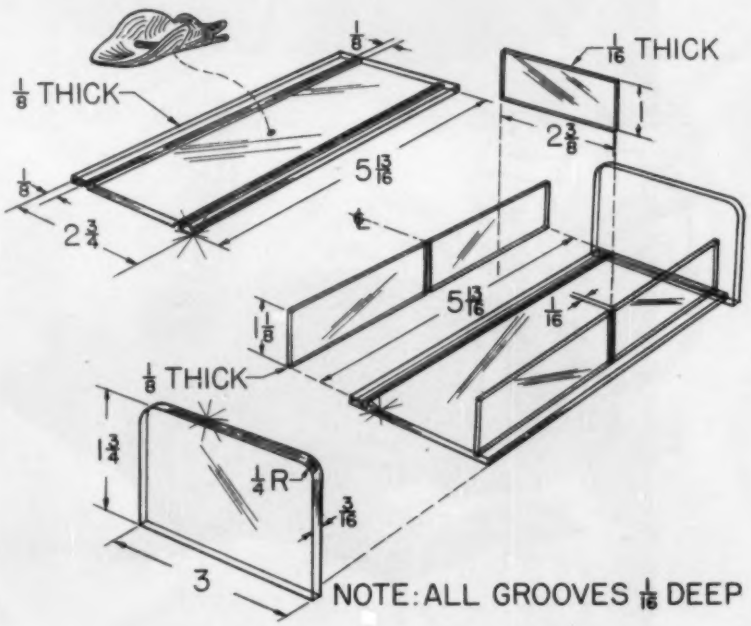
Procedure for Making the Flower Handle

1. Lay out the patterns as shown.
2. Cut the patterns to shape and transfer them to the plastic.
3. Saw the parts to shape.
4. Sand and buff all edges.
5. Remove the masking paper from the flower petal and heat the plastic for forming.
6. Form the flower petal around the 3/16 in. dia. plastic rod stock, which will later be used as the stamen.
7. Heat plastic for forming the leaf, and form it to the flower petal and stamen assembly.
8. Begin one in. from an end and taper the plastic rod stock, by sanding, to form the stamen of the flower.
9. Heat the stamen and bend it to form a slight curve.
10. Assemble all formed parts and cement together.
11. Sand a flat spot on the bottom of the flower and cement it to the center of the box lid.

To make the flower more realistic, flat surfaces of parts may be sanded before they are formed; then they are formed and dyed before assembling. Sandblasting the flower after it is assembled will also give a unique appearance.

The completed flower may also be used as a lapel pin by attaching a pinback to it.

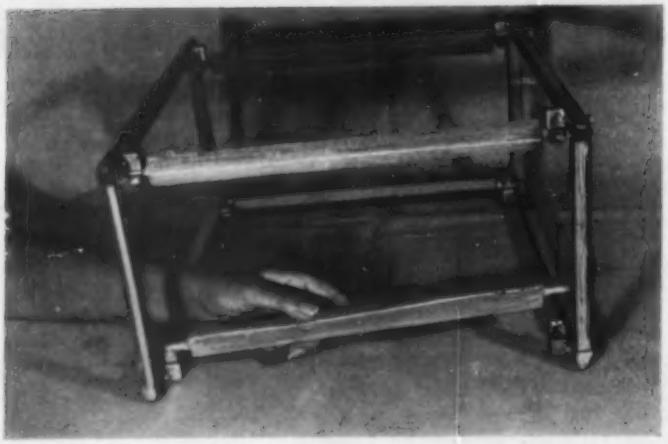


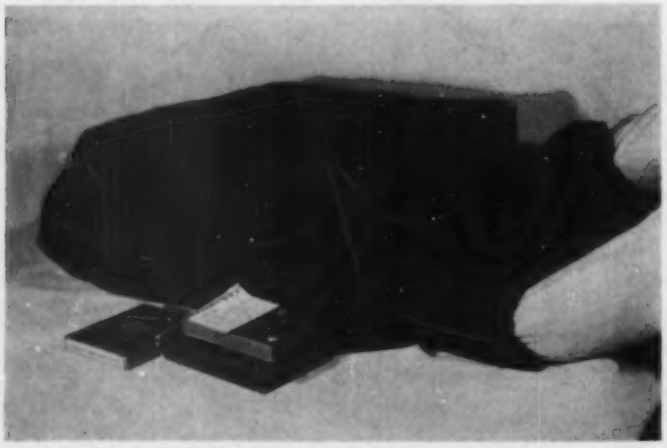


PORTABLE DARKROOM

HARRY J. MILLER

Sarasota, Florida





For beginning students in photography as well as for advanced pupils seeking dexterity in handling film in darkness, this frame which is collapsible and sets up quickly inside a conventional changing bag. At the same time it is a valuable adjunct to an overcrowded class in "shutter-bugging," since it permits cameras to be loaded or unloaded inside the stygian darkness of the black changing back. Because operation of the bag is conducted in the broad daylight of the classroom, this takes some of the load off the school's darkroom.

In addition, students learn the importance of refraining from entering the darkroom while film processing is going on and they learn, very quickly, to use extreme caution in handling film and keeping it away from light.

Where advanced students are assigned picture-taking jobs around the school, the changing bag permits film holders to be emptied and filled right in the classroom, without need for disturbing pupils working in the photography darkroom.

While the conventional black changing bag is a most valuable ally for many photographers who travel far afield, its prime disadvantage is that after the needed supplies are tucked inside and the hands placed through the tight-fitting sleeveholders, the folds of the bag lie upon the arms or fingers — or both — interfering with movement.

The simple frame, placed inside the bag and quickly assembled, makes a boxlike compartment which supports the fabric of the bag and provides a free, open place on which the hands can work.

For use when away from the classroom, the frame is collapsed and the bag, frame, and photography equipment are carried to the assignment. Or the frame may be kept permanently inside the bag which is thus kept constantly ready in the photography shop for student practice in loading film holders.

The frame dimensions given are approximate, since they need to be measured to the size of the school's changing bag. The two side frames, assembled with corner braces, may remain permanently inside the bag.

To use the bag, simply insert the four frame spreaders into the friction catches which are the type used on kitchen cabinets. Their snap-like action makes a firm box structure.

The frame is quickly disassembled by reversing this procedure.

The structural members are made from ¼ in. quarter round molding, with flat steel corner angles to stiffen each frame joint, and the ends of the long frame members are carved, or filed down to a ¼-in. by 1-in. tenon so they spring snugly into the friction catches.

SCHOOL CALENDAR

MICHAEL T. CONROY
Chairman, Industrial Arts Dept.
Junior High School 71,
Manhattan, N. Y.

The school calendar has been for the past several years an important part of the school life of the student body. An important aspect of this school calendar is the use of the problem solving technique in developing this project. This calendar is not only a printing project made from ink, paper, linoleum, and type, but it represents a learning experience that has helped to develop the youngsters into useful citizens — ones with the ability to think creatively and critically and act for themselves and in co-operating groups.

The school calendar serves many useful purposes, among these being:

1. It fosters school spirit in that it provides the student body with a product from which they can derive school pride.
2. The calendar enables the boys to make a product of size and value comparable with a calendar made in industry.
3. It enables boys to use their printing skills.
4. It establishes good public relations.
5. The production of the calendar fosters interest in industrial arts.

The calendar is the result of the concerted effort of the members of the school's Graphic Arts Club. The initial stage of the planning involved selecting a theme from which the calendar was to evolve so as to add purpose to the calendar and to make it of value educationally. The theme decided upon was "Great Americans." This theme was noteworthy as it exposed the boys to American History.

The boys were assigned to find a picture of an outstanding American and to prepare a brief biography on each man. This was to enable the boys to learn more about the men they had selected. This assignment required the youngster to use the facilities of his school or local library, thus integrating various aspects of language arts into our project.

When all of the reports were received, areas of responsibility were then delegated to each youngster. One of the boys, for instance, became the production manager; it was his job to co-ordinate work, assign jobs, and provide the necessary student leadership.

All of the pictures were cut from ⅛ in. linoleum, mounted on wood, and hand fed on a 10 by 15 press. All of the type was hand set and the calendar months were set from 12 pt. Century Schoolbook.

▶ As a unit of work in junior high school graphic arts, try —

LINOLEUM BLOCK PRINTING

PAUL E. PIERING
New York, N. Y.

Perhaps as the next holiday season nears, you will be inspired again with the idea of making your own greeting cards. This can be a simple enough task, if you follow these instructions carefully.

Preparing the Block

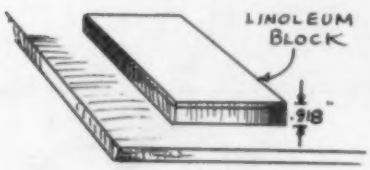
A specially prepared block may be purchased — or any ordinary linoleum with a burlap backing can be adhered to a block of wood, with linoleum paste. Plywood can be used, and it should be about 5-ply in thickness.

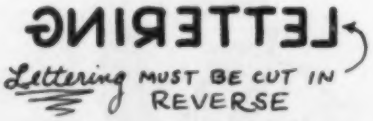
The linoleum surface should be painted with a thin coat of flat white paint, or white tempera. If the tempera "crawls" . . . mix a bit of ivory soap into the tempera paint.

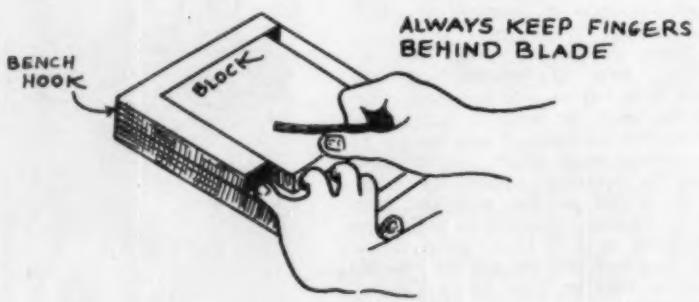
Transferring the Design

A design may be drawn or traced on a piece of white paper, and then transferred (in reverse — upside down) to the linoleum block. Place a piece of carbon paper, face down, on the block and lay your design on top of the carbon. Tape these sheets to the block with Scotch tape so as to hold them firmly in place.

Trace over all lines to be reproduced with pencil or sharp handle of an artist's







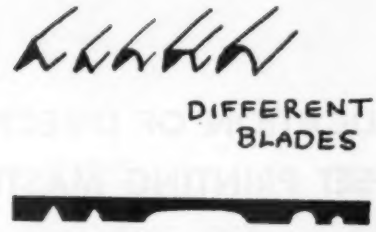
brush. Remove both tracing and carbon and paint over lines with a small brush and india ink.

Cutting the Block

To insure safe and easy cutting, keep linoleum block in warm place several hours before attempting to cut. Warm linoleum cuts much easier than cold linoleum. A bench hook also prevents injury to fingers when cutting.

Cut around each line in the design with a "V"-shaped gouge, keeping in mind the fact that only the raised lines will print. *Do not* make under

cuts because they will break off too easily. Fine lines are cut with a veiner and do not have to be cut in too deep. Backgrounds not to be printed, are cut with a round or "U"-shaped gouge. You will find some background lines



may print, even though you hadn't planned them. Leave some of them in, as they may add artistic interest to your linoleum block design. Be cautious when cutting; *most* slips cannot be repaired.

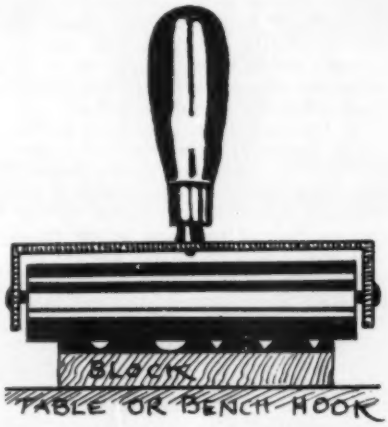
Mixing the Ink

Specially prepared inks in tubes or cans may be obtained at any art store. Squeeze a little ink on a piece of heavy glass and add a small amount of white since most colors show darker when they are printed. Roll brayer (roller) back and forth in all directions over ink, so that it will spread evenly.

Ink, mixed to the proper consistency, will emit a crackling sound, as the brayer flattens it out. A drop of linseed oil (raw or boiled) may be added when the ink becomes too heavy to manage.

Applying Ink to the Block

Place linoleum block in bench hook to prevent it from slipping. Roll brayer



over raised design in all directions, in order to spread ink evenly. Some of the background lines may be inked too. If you don't care to have these lines print, remove them with the round gouge before inking.

Printing the Block

If a printing press or linoleum printing press is not available, you may print by the following method:

1. Place an entire daily newspaper on the floor to serve as a pad.
2. Place paper that will receive linoleum print on the top of this newspaper.

3. Place inked linoleum block carefully, over the paper to be printed. (Do not slide as this will cause smudges.)
4. Step on block *carefully* and try to distribute the weight evenly.
5. Pick up block and carefully peel the print from the linoleum block.
6. Check proof for any errors or bad spots.
7. Ink block again and proceed in the same manner, for any number of proofs to be made. (If block is to be set with type for use in a printing press — the over-all height of block cannot exceed .918.)

Cleaning the Equipment

Excess ink on glass, brayer, and linoleum block may be wiped off with rags. The remaining ink can be washed with a little kerosene or benzine and an old

toothbrush. Turpentine should *not* be used because it leaves a gummy residue on glass, brayer, and linoleum block. ***The paint cleaning rags should be burned immediately, because spontaneous combustion may take place later on.***

To prevent damage to block . . . place heavy cardboard over the face, or design surface, and wrap with heavy wrapping paper. Keep block flat and in a dry place. When ready for use again, the block will be as good as new.

AN APPLICATION OF DIRECT IMAGE OFFSET PRINTING MASTERS

CHARLES L. THOMAS
Instructor, Graphic Arts
Northern Illinois University

The offset process has found its way into many graphic arts curricula within industrial arts and vocational programs. Statistics indicate that the offset method of duplication holds a most prominent place among the other processes of letterpress, stencil, and gravure. This rapid growth of the offset process in industry as a fast and versatile means of printing has created a vital need for instruction. Those graphic arts teachers who have already responded to the need and have instruction under way in this area will readily testify to its interest and popularity among students. In addition, those same teachers will have learned also that the small automatic offset presses are particularly adaptable in situations occasionally (or frequently) called upon for the production of school printed materials. The matter of such production versus instruction is often contested and usually resolved to the established precedence of each teaching situation.

The ideal, of course, is to utilize the facilities of graphic arts areas for production purposes only insofar as such production fits into a well organized instructional program. In either case, where consideration may be given to the inclusion of the offset process, there is a strong possibility that a relatively inexpensive and simple production technique may have been overlooked. Such a technique involves the use of the direct image offset master. If the graphic arts teacher has a number of "standing" letterpress forms, this technique will enable him to convert many of them to production by offset. Furthermore, the cost will be but a fraction of that usually paid to convert by photographic method. Another point to be made is that the equipment required to convert from letterpress form to offset master is standard and exists in most graphic arts shops.

A recent publication lists nine brands of direct process plates on the market.* Any one of them may be suitable for the following procedure. It should be noted that there are usually short run, medium run, and long run qualities of masters and their selection is a matter of preference and/or application. Other considerations in the selection of a direct process master should be its erasing characteristics, resistance to abuse in handling, dimensional stability on the press, and compatability with your offset solutions and inks.

*Chart of Non-Metallic Direct Image Masters, *ODR Reproductions Guide*, First Edition, 1960, pp. 124–125.

Procedure

1. Choose the letterpress form which will adapt to the offset process. (The accompanying photographs show the use of one smaller form in creating a 4-up arrangement on a direct image master.) Membership or I-D cards, desk memos, absence blanks, room reports, are some examples of standing forms which lend themselves well to this technique.

2. Lock the form in a chase in the usual manner. The press will of course have to be large enough to accommodate the 10 by 15 inch master. Individual equipment will dictate the exact location of the form in the chase for proper position on the master. The ideal press for this would be the register-type proof press in which case appropriate procedures could be easily devised. Such a press is not, however, very commonly found in the average school shop.

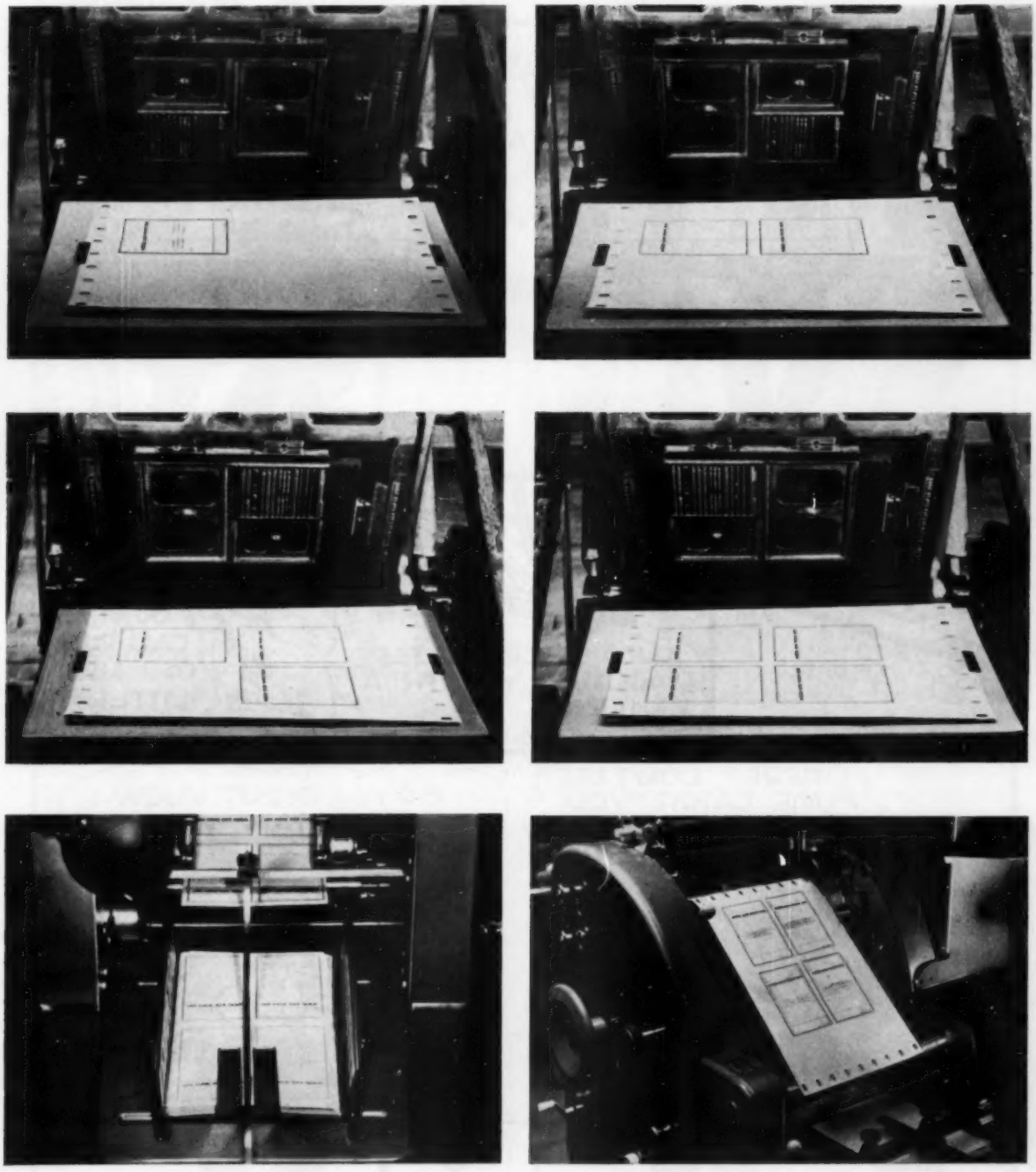
3. Make ready in the usual manner. Instead of wasting good masters, cut some book paper or ledger that is of same size and thickness as the master. One of the quick drying inks was used successfully by the writer, however ink recommendations are made by master manufacturers. Gage pins may be used, although masking tape, which will not pick the surface of the master, may be desired as shown in the photographs. Use of the tape prevents piercing the tympan when a number of different forms are being converted to offset masters or when moving the master on the tympan is preferred to moving the same form in the chase to create 2-up or 4-up arrangements. The end results can only be as good and sharp as the press proof at this point. Do not "emboss" excessively, but a little overimpression will not effectively injure the master and will give the necessary sharpness to the proof.

4. The actual direct image master cannot be fixed in position on the tympan and impressed by the inked form. Keep the surface of the master free from stains, smudges, wrinkles or scratches. Carefully allow it to dry well before using it on the offset press. A master may reproduce 500, 1000, or 5000 impressions, so now is the time to calculate total needs and make enough masters to serve the future. Masters can be filed in folders for running at any later date, and the old letterpress form can be distributed.

5. Once thoroughly dry, the master may be placed on the automatic offset press. The procedure here is a matter of preference. Some operators recommend application of an "etch" *before* placing the master on the press — others prefer to etch while the master is on the press. In either case it is important that when the master has been securely mounted to the plate cylinder of the press, it must be clean, and it must be moist before it is brought into contact with the ink rollers. Whether using an "aquamatic" or conventional ink and fountain solution system, for best results keep the moisture low in operation and always moisten the master first before starting after any stop.

Without facilities to teach offset in the graphic arts shops of our schools today, only a portion of the story can be told of one of our major industries. School budgets may not permit immediate purchase of an entire photolithography layout, but persistence in justifying the need may yield at least an offset press. Pre-sensitized plates, process camera, stripping tables, and cold-type composing machines may come later. In the meantime there is much that can be done and taught through the medium of the direct image master.

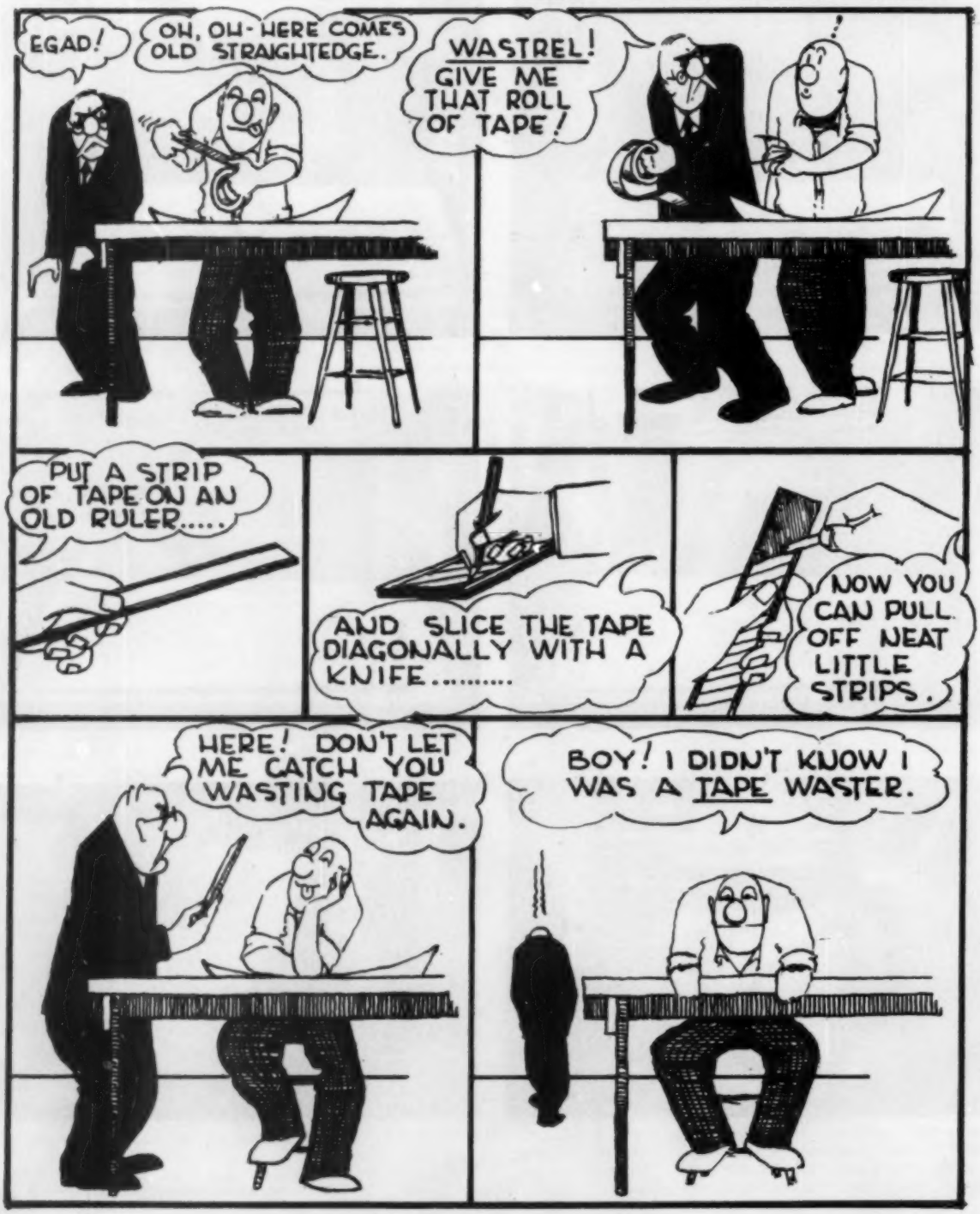
six stages in the application
of direct image offset printing masters —

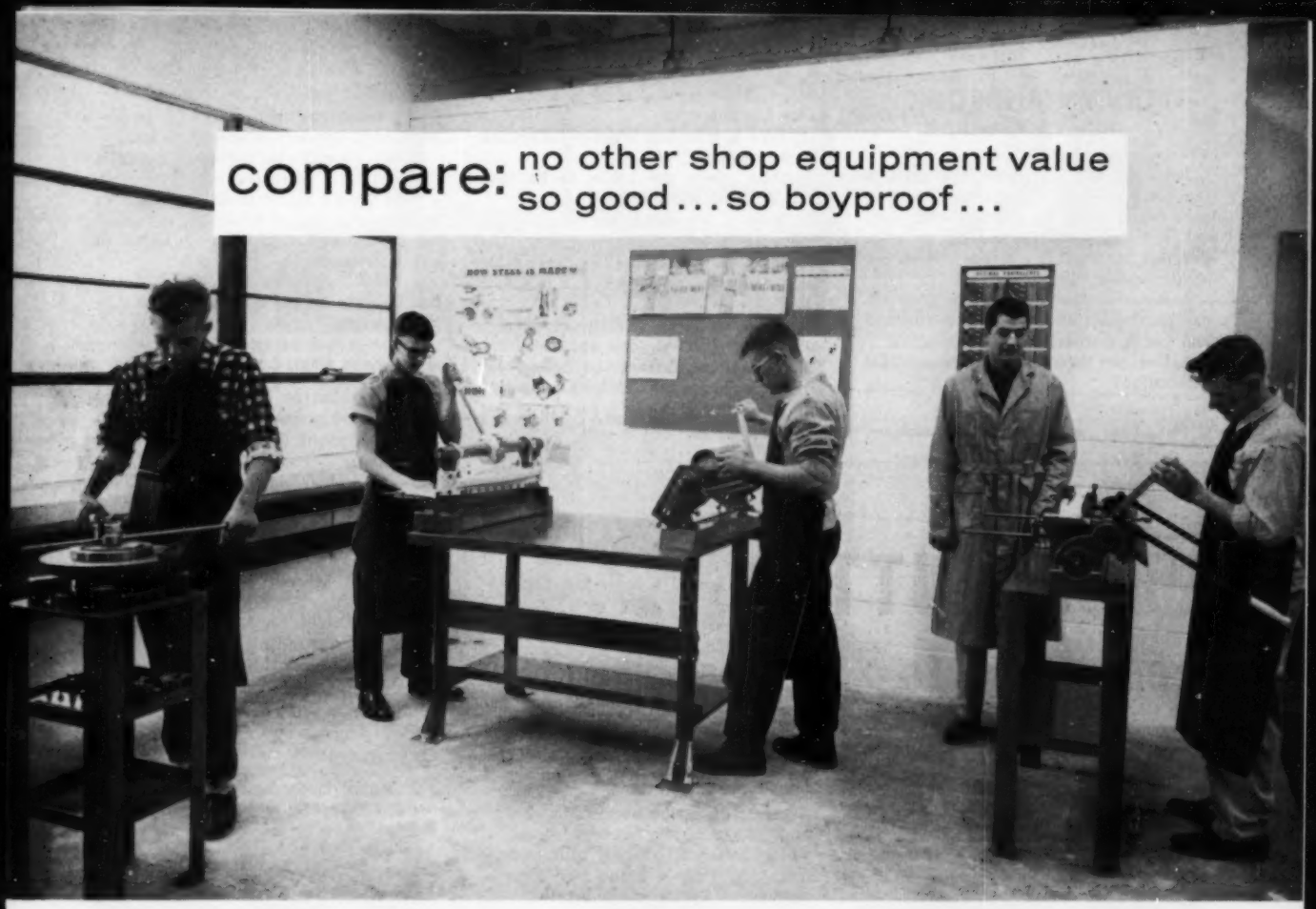


OLD STRAIGHTEDGE

THE DRAFTSMAN

By John D. Springer


EGAD!
OH, OH - HERE COMES OLD STRAIGHTEDGE.
WASTREL! GIVE ME THAT ROLL OF TAPE!
PUT A STRIP OF TAPE ON AN OLD RULER.....
AND SLICE THE TAPE DIAGONALLY WITH A KNIFE.....
NOW YOU CAN PULL OFF NEAT LITTLE STRIPS.
HERE! DON'T LET ME CATCH YOU WASTING TAPE AGAIN.
BOY! I DIDN'T KNOW I WAS A TAPE WASTER.



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- Brake stand, welded steel, 33" high, storage shelf
- Di-Acro Bender No. 2 capacity ½" bar, ¾" tube
- Bend-R-Pak No. 2, bender accessories
- Bender Stand, welded steel, 33" high, two shelves
- Machinery Table, 48" x 36", welded steel, shelf

This group of machines represents a complete range of metal forming processes. Anything that can be cold formed in a variety of materials, ie. – sheetmetal, bar and flat stock, tubing, etc., can be demonstrated and duplicated by your students.

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(For more information from advertisers, use the postcard on page 59)

POLICY HANDBOOK

(Concluded from page 19)

The Industrial Arts Program

Industrial arts education is a part of the total program of education and as such should be for all young people.

1. Are the standards and the program designed to challenge various levels of ability and intelligence?
2. Is the program written and clear regarding prerequisites, levels of instruction, and length of courses?
3. Does the program encourage continual exploration?

Maintenance

The proper care and repair of machines, tools, and the physical plant is a maintenance function.

1. How is a request initiated for getting the shop painted?
2. Who selects the colors to be used when painting the shop?
3. Who is responsible for painting the machines?
4. Who is responsible for preventive maintenance on machines? Is a schedule set up?
5. How are requests initiated for major and minor repairs on tools and machines?
6. What procedure is established for ordering replacement parts for machines?
7. What budget items cover major and minor repair and replacement?

Substitute Teachers

The substitute teacher acts in the absence of a regularly assigned teacher.

1. Are needed instructional materials provided for a substitute?
2. Is there a list of available substitutes in the administrative office?
3. Are written instructions available to substitute teachers?
4. What procedure is followed by a teacher when he is absent and needs a substitute teacher?
5. Are procedures set up for emergency absence and planned leaves of absence?

The committee of the Los Angeles County Industrial Education Association anticipated that this guide would be used by teachers and administrators identifying a need for administrative policies in industrial arts education. It may meet as a group and select the categories that it feels need written guidelines. As a group it can answer the questions set down here and with the approval of the members' immediate supervisors, principals, superintendents, and boards of education, may have this as their guidelines to order, good morale, and good administration.

Following is the preface as it appears in this guide:

Industrial arts educators are constantly searching for new ways to improve their instructional program. Many of these same people are often beset by numerous incidents that cause unnecessary misunderstandings because of indefinite or undefined policies as they relate to the Industrial Arts Educational Program.

Administrative policy may be suggested by persons working in their respective jobs, forwarded to administrative heads for approval, and then accepted by the board of education. This Guide consisting of topics often found to need clarification and policy determination may not be complete. The authors do not infer that all districts have not already clarified these policies; however, it may serve as a reference for those who would like to aid in the development of policy or to revise their present policies.

You are encouraged to use this Guide, to fill in answers to the proposed questions, and with mutual consent and agreement among teachers, administration, and the Board of Education may help to form policy. The adoption of policy is a necessary ingredient in establishing high morale and sound administrative organization.

The effects of this work are gradually helping the industrial arts programs in this county. If only a few are affected, the association and the committee appointed by the association feel that the time was well spent. As more people take advantage of written policy in industrial arts education, problems in this area will be decreased. Teachers and administrators will be working hand in hand in the improvement of the educational program on a written basis that has been determined objectively and without emotional stress.

PUSH BUTTON *Speed Selection*

from to in seconds

or to *any* intermediate speed, *instantly*

Teach modern methods with these strictly modern lathes that eliminate all hand belt shifting and deliver even the new high speeds with the touch of a button.

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It is a precision lathe moderate in price with the versatility for safely teaching both beginning and advanced students.

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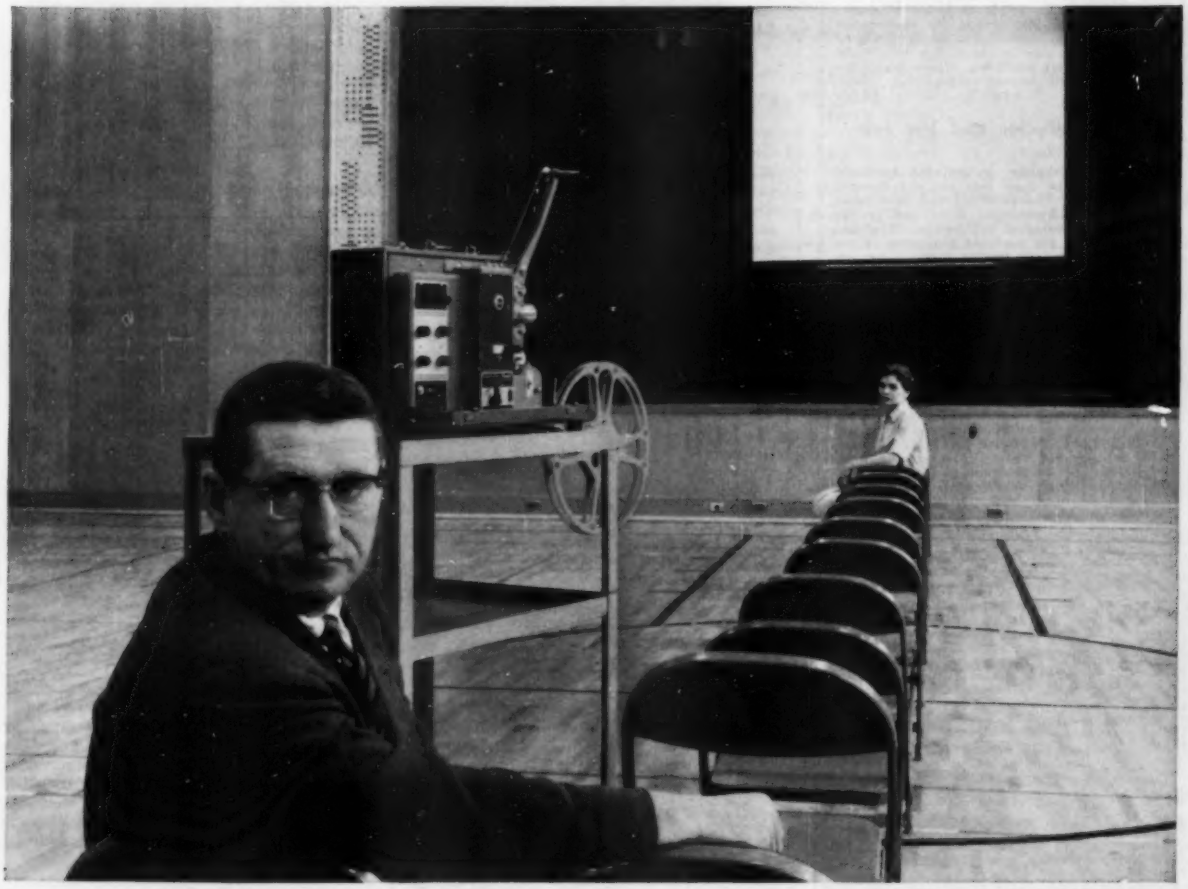

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NEW BOOKS

(Concluded from page 8)

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About Chemistry

By Magnus Pyke. Cloth, 219 pp., 5¾ by 9 in., illus., $4.50. The Macmillan Company, New York 11, N. Y.

In this book, the author helps the layman to understand what chemistry is all about and how it is that man has been able to collect chemical facts and turn them to practical use. The subject matter is divided into ten sections, and takes up such points as: what chemistry is all about, what things are made of, chemical reactions, chemistry and metals, catalysts and chemistry, carbon chemistry, using organic chemistry, biochemistry, plastics, and atomic energy and the ultimate constitution of chemical substance, followed by an index.

Supermarketing

By Frank J. Charvat. Cloth, 276 pp., 5¾ by 8½ in., $6.95. The Macmillan Company, New York City.

Directed toward a broad audience, the material in this book is meant to be an aid to those engaged in food and related-industry fields such as, executives, key employees, and those aspiring to positions of responsibility, and marketing students at the university level. Top executives will find of particular interest the chapters on financial considerations, the impact of the supermarket on the food industry, and managerial policy and practice.

The Sextant Series for Exploring Your Future in Manufacturing

Introducing the Wilkinson Method of Personal Profiling with Forewords by Nick John Topetzes, Ph.D., and Clarence Seybold. Paper, 98 pp., 8½ by 11 in., illus., American Liberty Press, Milwaukee, Wis.

The Sextant Series consists of 24 volumes. It is designed for student use under the direction of counselors and teachers to assist them in explaining career possibilities. Student self-exploration and comprehensive information about jobs, most important in occupational planning, are covered thoroughly. All occupations described include reliable information concerning the nature of the work, requirements needed, promotional outlook, and other facts. By using the Wilkinson Method, the counselee is furnished with an opportunity to identify his assets and liabilities as objectively as possible. Valuable to teachers, counselors, personnel workers, psychologists, and others engaged in career counseling.

National Electrical Code and Blueprint Reading

By Kennard C. Graham. Paper, looseleaf, 153 pp., 8 by 11 in., illus., $4. American Technical Society, Chicago 37, Ill.

This is a pictorial presentation of safety measures and standard practices in electrical wiring based on the latest Code. Code sections are linked to visual examples and are grouped around five specific fields of applications. The subject of electrical blueprint reading is carried on simultaneously as a part of instructional procedures. Electrical plans are inserted at key points throughout the text.

Satisfying Customers for Profit

An Electronic Industries Association Project. Paper, 96 pp., 6 by 9 in., illus., $1.25. Howard W. Sams & Co., Inc., Indianapolis 6, Ind.

This book, designed especially for service-type business, points up the importance of handling customers and their problems with maximum tact. It uses a conversational style to present 25 field-tested case histories typical of those most likely to confront a radio-TV service dealer, but the basic principles involved can apply to any service type business. This book on customer relations is the latest in a series, previous publications having dealt with technical skills.

Creative Color

By Faber Birren. Cloth, 128 pp. (32 pages in 4 color, 32 pages in 2 color), 8½ by 10⅜ in., $10. Reinhold Publishing Corp., New York, N. Y.

In this latest book the author's thesis is "color is a progressive art, and the artist who does not avail himself of the progress made in color knowledge is overlooking one of his most important sources of inspiration." In the book Mr. Birren isolates a necessary part of the artist's job — color mixing — and subjects it to radical review in the light of the new science of perception. The author's unlimited fascination with color suffuses basic academic data with fresh meaning and enthusiasm. The book will be valuable to the artist and useful to commercial artists and designers in many fields.

Print Making With a Spoon

By Norman Gorbaty. Cloth, 68 pp., 7¾ by 10⅜ in., illus., $3.95. Reinhold Publishing Corp., New York 22, N. Y.

This book is meant to fill the need for literature on print making specifically written for that audience which comprises many children on the elementary and high school levels of education and nonprofessional adults. The book is written with simplicity and clarity, and the methods presented require the least amount of tools and special equipment to create a printed image.

The Vocational Maturity of Ninth-Grade Boys

By Donald E. Super and Phoebe L. Overstreet. Cloth, 212 pp., 6¼ by 9⅛ in., $5.25. Bureau of Publications, Teachers College, Columbia University, New York, N. Y.

This is the second report of the Career Pattern Study conducted at the Horace Mann-Lincoln Institute of School Experimentation. It lays the groundwork for the study of career development of boys during the years succeeding the ninth grade.

The report gives the results of the first year of research, which has clarified the nature of educational problems involved in the making of vocational decisions in the early high school years. The chief concern is to determine the degree to which ninth-graders are capable of selecting school curricula which will prepare them for a career in one particular area.

NEWS

(Concluded from page 10)

cation, and professional, June 5 to August 4. Contact R. A. Schreiner, chairman.

2. At the University of Idaho, Moscow, three short workshops. Power tool maintenance, June 20–23; finishing materials and methods, July 3–14; General Metals, July 17–28. Contact W. R. Biggam, chairman, Industrial arts department.

3. At the University of Hawaii, Honolulu, courses in industrial arts for elementary teachers; problems in industrial education; seminar in industrial education. Contact Marvin F. Poyser, chairman.

4. At Indiana State College, Terre Haute, a summer workshop program in metals, June 5–9; in woods (2), June 12–16; in general shop, August 14–18, in electricity, August 14–18, in drafting, August 21–25. Contact Warren J. Wold, chairman.

5. At the Hobart Welding School, Troy, Ohio, a one-week welding refresher course during the second and fourth weeks of June, July, and August.

doctorate program The Texas State Commission on Higher Education has authorized the Agricultural and Mechanical College of Texas at College Station to offer a Doctor of Education Degree in Industrial Education. This designation makes Texas A & M the first institution in the southwest to offer the advanced degree for industrial arts and/or vocational industrial education, according to Dr. Chris H. Groneman, head of the department.

I-A advisory council Formation of an advisory council for industrial arts at the New York State University College of Education at Oswego was announced recently by Paul W. DeVore, acting director of the division of industrial arts. The council, composed of three representatives from management, three from labor, three from high school guidance departments, one public school administrator, and members of the college faculty, will explore the possible need for a permanent organization to serve as a basis for the mutual exchange of information and discussion of problems involving education-industry relationships with emphasis on our changing culture and technology. Topics for the first meeting include (1) how to provide high school students with a more thorough understanding of their industrial culture, (2) how to provide breadth and depth of I-A experiences related to material and processes necessary for employee adaptation in today's industry, etc.

An Ogden, Utah, high school student has been named winner in the pepper mill design contest sponsored by the George S. Thompson Corp., Monterey Park, Calif. Dennis Berglund used a casting of polyester resin over drapery material (shown on top); his teacher is Arlo Felix. Second prize went to an entry of walnut lamination; third to one of Arizona cactus wood.

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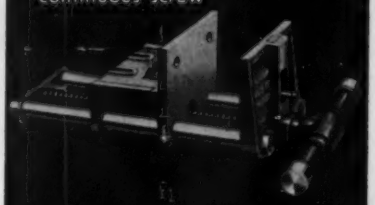

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ASSOCIATIONS

(Concluded from page 21)

2. Does industrial arts have as its major purpose the development of skills for skill's sake, or should the major emphasis be on understanding and on using the basic principles related to the use of tools and machines?

3. Should industrial arts concentrate on making things and projects or should greater attention be given to problem solving? He concluded by indicating that industrial arts needs to re-study its place in American education and also in our industrial society to make sure that it fulfills the need of our present student population.

Following this major meeting, the convention broke into smaller groups to study in greater detail some of the issues raised by Dr. Micheels. Some of these topics included: "Should the Objectives for Industrial Arts Change?" "Should the Organization Change?" "Should Methods Change?" "Should the Nature of Manipulative Course Work Change?" and "Should the Physical Facilities for Industrial Arts Change?"

Friday

The climax of the convention was the Friday morning presentation of demonstrations of industrial arts content which reflect advanced technology. This was a series of excellent demonstrations given by students and faculty from various public schools and colleges. Some idea of the range of activity can be gained by reviewing a few of the demonstrations presented. These included: (1) foamed plastic for the school shop, (2) the vu-graph in teaching drafting, (3) industrial hydraulics and numatic, (4) injection molding of plastic, (5) transistors and their applications to electrical programs, (6) modern industrial finishes, (7) spot welding, (8) the transistor radio, (9) wood lamination, (10) die stamping, (11) developments in the reproduction of drawing, (12) utilization of printed circuits in electronics, (13) studying metallurgical specimens, (14) new methods of metal forming.

Friday afternoon, another series of smaller meetings identified good practices in various areas of industrial arts. The titles of these series were as follows: "What Characterizes Contemporary Industrial Arts Drafting — Wood, Metal, Electricity, Graphic Arts," and so forth.

The final program of the evening was the annual banquet at which Dr. Ray Karnes, past president of the American Industrial Arts Association presented the keynote speech. "What is the Future of Industrial Arts?" The high spot of the evening was the presentation of the "Man of the Year" award. This award is given annually to one of the outstanding and distinguished educators in the area of industrial arts education. The award was made to Dr. Verne C. Fryklund, president of Stout State College, for his years of contribution to the promotion of the profession.

Educators attending the convention had many opportunities to visit schools and industrial establishments in St. Louis and the surrounding areas. Visits were planned to public schools and technical schools and also tours of industrial plants. It would be impossible to report in detail the names and contributions of the hundreds of speakers, recorders, hosts, and panel members. Because of their unfailing generosity in time and effort, all who were in attendance will look forward to the 1962 convention. Next year we hope to see you all at the Pittsburgh Hilton Hotel in Pittsburgh on April 16 through 19. ◀

CALIFORNIA I-E ASSOCIATION

A Leadership Development Conference was sponsored by the Southern Section of the California Industrial Education Association, and held at Long Beach State College on May 20, 1961. Newly elected officers of all the local chapters of the southern section participated in the program.

Dr. Clifford Dobson, chairman of the industrial education department at Los Angeles State College, was one of the keynote speakers for the conference. His topic was "C.I.E.A., What's Our Story?" Another keynote speaker, Dr. George Dotson, assistant superintendent of secondary education, Long Beach City Schools, discussed "Leadership Responsibilities of a Professional Organization."

Quentin Prosser of the Long Beach City Schools was chairman of the conference.

CALIFORNIA I-A COUNCIL

The California Council of Industrial Arts Teacher Educators, in conjunction with the annual convention of the California Industrial Education Association in Fresno elected the following officers for the year 1961–62:

President — Dr. Joseph K. Thomas, associate professor of industrial arts, Long Beach State College; vice-president — Dr. Carlisle Anderson, San Diego State College; and secretary-treasurer — Dr. Irvin T. Lathrop, Long Beach State College.

KENTUCKY-TENNESSEE INDUSTRIAL ARTS CONVENTION

A two-day industrial arts teachers conference was held at East Tennessee State College, Johnson City, Tenn., on April 14 and 15, and L. D. Wallis, professor of industrial arts at the College, was general chairman. The conference was attended by 34 industrial arts teachers from five Kentucky and three Tennessee colleges.

COMING CONVENTIONS

June 12–16. Colorado Vocational Association, at Colorado State University, Fort Collins, Colo. Exhibit chairman, Herbert L. Benson, Colorado State University, Fort Collins, Colo.

June 12–16. Idaho Vocational Education Association, at Idaho State College, Pocatello, Idaho.

June 25–30. National Education Association, at Atlantic City Auditorium, Atlantic City, N. J. Exhibit chairman, R. E. Carpenter, 1201 — 16th St., N.W., Washington, D. C.

Sept. 29–30. Ohio Vocational Association, at Southern Hotel, Columbus, Ohio. Exhibit chairman: Walter R. Lund, 3520 Central Parkway, Cincinnati 23, Ohio.

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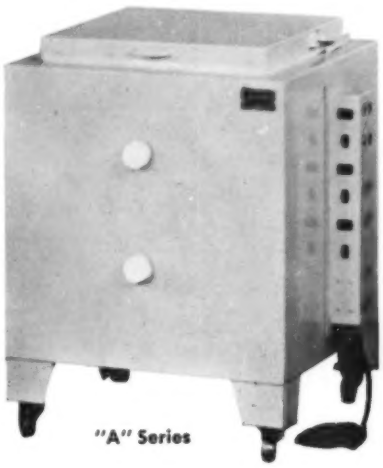
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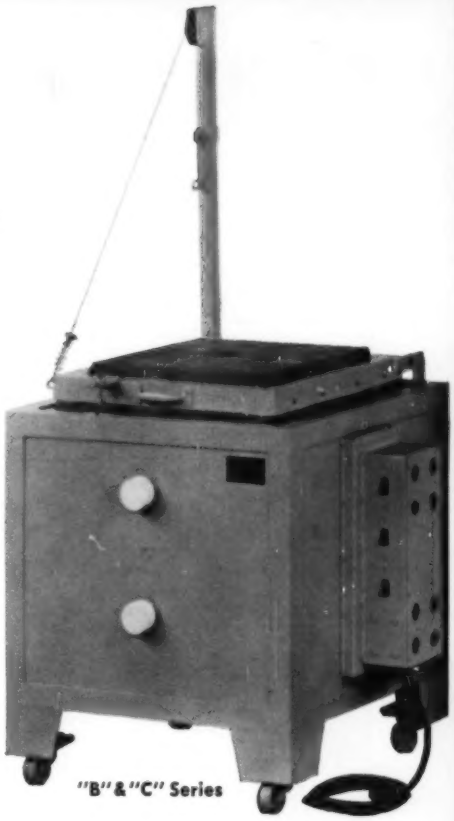
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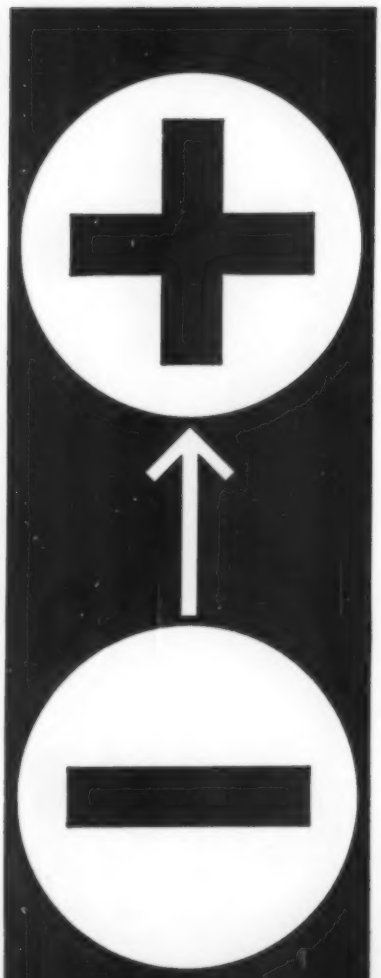

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RESEARCH

(Concluded from page 7)

the school district and the instructor? A study conducted by Dr. Kigin[2] reported that though most school districts are immune to liability under the principles of common law immunity *teachers are not protected by this immunity and can be held liable for classroom accidents if negligence can be proved.* He reported that negligence is the most common reason for which a shop teacher can be held. Some examples of legal grounds for negligence that apply to the school shop situation are:

1. An act not properly done.
2. An act done under circumstances to create a risk.
3. Entrusting dangerous devices or instrumentalities to persons who are incompetent to use or care for such instruments properly.
4. Failure to employ due care to give adequate warning.
5. Failure to exercise the proper care in looking out for persons whom he has reason to believe may be in the danger zone.
6. Failure to employ appropriate skill to perform acts undertaken.
7. Failure to make adequate preparation to avoid harm to others before entering upon certain conduct where such preparation is reasonably necessary.
8. Failure to inspect and repair instrumentalities or mechanical devices used by others.
9. His written or spoken word create negligent misrepresentations.[3]

A closer look at the legal aspects of accidents in the school shop revealed that three conditions must exist before an action may be brought for negligence: (1) the defendant (instructor) must owe the plantiff (pupil) a legal duty to use care; (2) the defendant must have *neglected* to perform that duty; and (3) the plaintiff's injury must have proximately resulted from the neglect. The second of these conditions, negligence, affords a wide range of variation in grounds for action.

Legal Charges

Pinckney reported that the most frequently occurring legal charge made in case of accident was "violation of safe place statutes." This statute is one enacted by state legislatures which require safe construction and maintenance of buildings. This could be both private and public buildings depending upon the statute passed in each state. In some states school districts are not held liable for violation of safe place statutes while in others they are liable. In only five states has the judicial interpretation of statutes imposing liability on school districts permitted recovery in tort actions. A tort is any wrongful act violating the right of an individual to the security of his person. These states are: California, Connecticut, New Jersey, New York, and Washington.

"Failure to properly inspect and repair equipment" and "failure to employ due care to give adequate warning" were found by Pinckney to be the second and third most frequently occurring charges of violation in case of accidents. These would seem to indicate to industrial instructors that we must exercise special care in our day-to-day teaching situation.

Violations of safe practices must not go neglected, tolerated, or ignored. It is our legal and moral responsibility to teach using the best safety practices available. If your principal or superintendent refuses to assist with your eye safety program or some other phase of safety get his refusal in writing and file it away. *By law, liability accrues to the person who is conducting the activity in which an injury occurs.* This is you and me.

While the legal aspects are very complex and vary from state to state, Dr. Pinckney found that many people feel that perhaps the best solution is a well-written accident insurance policy. Dr. Kigin found that 19 states have a group occupational insurance plan as a means of protection. Such a plan would permit the pupil to recover his medical expenses regardless of whether the accident was due to his negligence or that of the instructor or the school.

Three recommendations developed from Dr. Pinckney's study. He proposes that legislative enactments should be sought that will:

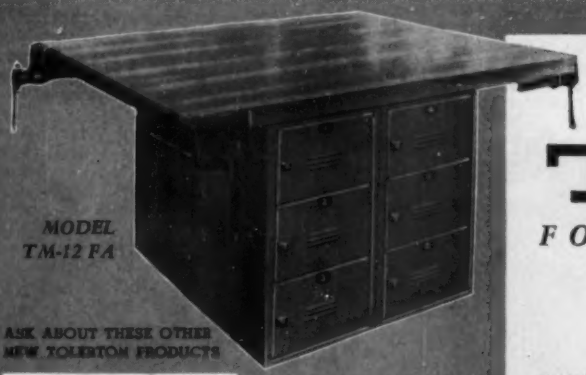
1. Impose direct liability upon school districts for the acts or omissions of its employees in the same manner as obtains for private employers.
2. Permit recovery to the extent of indemnifying medical treatment and care to pupils injured in any school activity, regardless of whose fault brought on the injury.
3. Authorize the purchase, out of school funds, of accident insurance protection for pupils to provide the indemnity permitted in recommendation two.

Mr. Industrial Instructor, the liability seems to fall squarely upon your shoulders. Is your shop as safe as you can make it? Have you tried to think ahead to forsee possible hazardous situations? Are you protected from heavy financial loss? Are your students and their parents protected by insurance against heavy medical expenses? We all know it is impossible to eliminate all accidents but we have the responsibility to try.

I would like to conclude by quoting Dr. Kigin. He states that, "A shop teacher, who remains *in the classroom* while the class is in session, who properly *instructs* pupils in the use of tools and machines, who maintains a constant *safety program*, and who has the welfare of the pupils at heart, should have little fear of liability."

[2]Kigin, Denis J., "Tort Liability Affecting Shop Teachers with Provisions for Avoiding Accidents and Litigation," University of Missouri, Unpublished Doctor's Dissertation, 1959.

[3]Harper, F. W., "A Treatise on the Law of Torts" (Indianapolis, Ind.: Bobbs Merrill Company, 1938).



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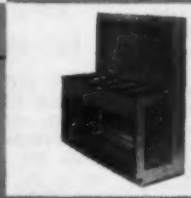

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- 100% Flame Failure Safety Feature for Pilot Available
- Package Unit Includes: Furnace, Piloted Burner, Motor Blower, Cast Iron Pouring Ladle and Pouring Shank. $245.00

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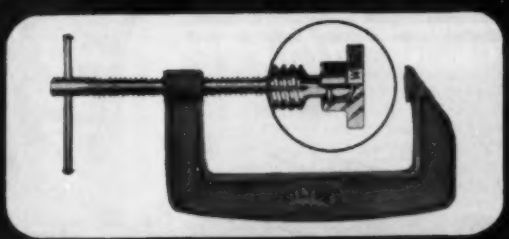

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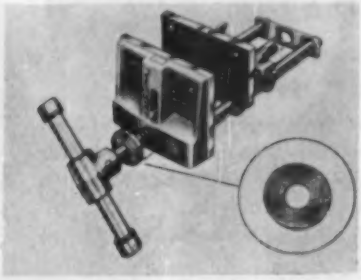
equipment

woodworking vise with thrust bearing From Wilton Tool Manufacturing Co., Inc., lifetime lubricated Oilite (oil cushioned) thrust bearing furnished on Wilton Woodworking Vises. The Oilite

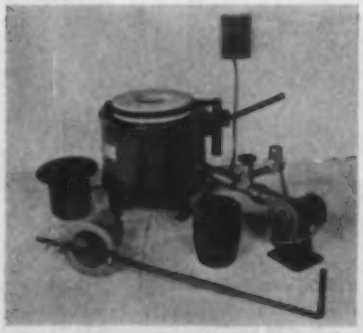


Woodworking Vise features Oilite Thrust Bearing

bearing is made of sintered bronze and is oil impregnated under high pressure. Self-lubricated on both sides, it develops less friction, and allows the operator to tighten his Wilton Vise to the exact pressure required, with minimum effort. Oilite thrust bearings have wide application and acceptance in many other industries. Complete information on Wilton Woodworking Vises is available from the company.

(For further details encircle index code 0601)

soft metal melter From McEnglevan Heat Treating and Manufacturing Company, Inc., Model B10-SM Soft Metal Melter, designed to fill the need for a ladle melting furnace for the general metals shop. Capable of melting aluminum, brass, and bronze at great speeds. A specially designed, cast chrome iron melting ladle is sus-



Model B10-SM Soft Metal Melter

pended through the lid into the furnace chamber. A pouring shank, designed for the ladle, is furnished with each furnace. The metal being melted is always visible and can be poured directly from the ladle by attaching the pouring shank and lifting out the ladle. The B10-SM will fill the requirements for a compact, versatile melting furnace, at moderate cost. For complete details on its construction, insulation, installation, operation, and maintenance, and other information concerning its capacity, weight, and safety features, please write to the manufacturer.

(For further details encircle index code 0602)

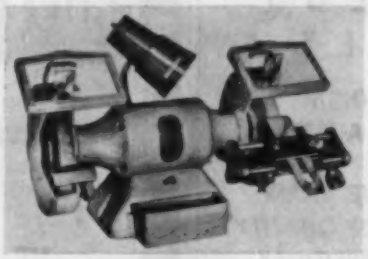
shaper worktable From Boice-Crane Company, to match the heavy-duty spindle characteristics built into its Shaper, enlarged worktables, which result from the addition of two extensions which bolt to

Shaper Worktable

the front and rear of the main table. Both are precision ground for alignment and surface accuracy. Each extension measures 8 by 27½ in., making the enlarged table 36 in. by 27½ in. over-all. Each shaper shipped is machined to receive the extensions, so they can be added in a few minutes by anyone, even after the machine is in service. Please write for the 4-page illustrated brochure on the new accessory and the shaper.

(For further details encircle index code 0603)

electric tool grinders From Wissota Manufacturing Company, a new series of three electric tool grinders especially designed for industrial arts shop use. The Wissota ½ h.p. model features a slow speed

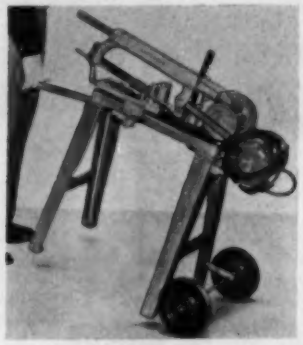


Electric Tool Grinder

(1725 r.p.m.) heavy duty motor. There are also ½ h.p. and ¾ h.p. models with 3450 r.p.m. capacitor start motors. The small diameter of the motor allows easy access to front and sides of grinding wheels. Wheels are of high quality, fully vitrified, tested and balanced. One wheel is of coarse grit, one medium. Safety features include large eyeshields, spark breakers, and wheel guards. Flexible goose neck lamp, water pot, special chisel, and plane iron attachment are standard equipment. U.L. and C.S.A. approved 3-wire cord and 3-pronged plug. Dual voltage, 115/230 v. Please write for further information.

(For further details encircle index code 0604)

portable power hacksaw From Sales Service Manufacturing Company, a portable floor model of the Jefferson "601" Power Hacksaw which has been added to their line of Keller Power Hacksaws. The rear pair of rugged cast legs are equipped with 7-in. ball bearing, rubber tired wheels that roll easily practically any place. A handle at the front makes it easy to tip the saw onto the wheels and pull or push it with little effort. Saw capacity is 5 in. wide by 4 in. deep with a fast acting swivel vise that permits sawing any angle to 45 deg. on material up to 3¼ in. wide. All bearings are Oilite and the saw frame is equipped with adjustable, replaceable bronze wear strips. A latch bar holds the frame in up position. The saw feeds by

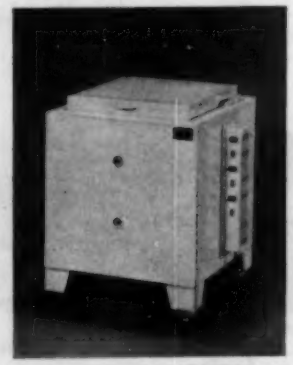


Portable Model Power Hacksaw

gravity and the weight of the rugged frame provides fast cutting. A length gauge bar permits cutting uniform lengths. Pressure is relieved on the back stroke to prolong blade life. Saw stroke is 3¾ in., and 10- or 12-in. blades may be used. All cast construction for durability, and includes a ¼ h.p., 1725 r.p.m. motor on a built-on motor mount, drive pulley and vee belt. For complete details and prices write to the manufacturer.

(For further details encircle index code 0605)

improved kiln line From Denver Fire Clay Company, their refined and improved kiln line following purchase of the California Dickinson Kiln Company last year. Kilns range in size and models to



meet the requirements of beginning potters up through large industrial use shuttle kilns. The DFC-Dickinson line features all-welded construction, improved controls, heavy duty electric elements and precision fitted doors. Five models in three series are available, ranging from one to sixteen cubic feet oven capacity, in a variety of firing speeds and ranges with any type of automatic safety control equipment. Kilns come in three pastel colors or can be finished to fit any decor. Mounted on easy roll casters for quick movability. Further information available.

(For further details encircle index code 0606)

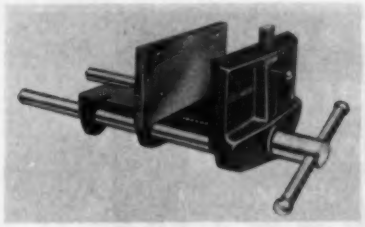
planer From Rockwell Manufacturing Company's Delta Power Tool Division, their new 18-in. planer featuring separate feed and wedge bed. The new unit handles stock up to 18 in. wide and from ⅛ to

Delta 18-in. Planer

6 in. thick. Depth of cut is limited to ¼ in., as a safety factor to eliminate any possibility of operator's fingers being caught between the girt and stock being fed. Overall dimensions of the planer are 31½ in. wide, 32 in. deep, and 41 in. high, and it occupies floor space measuring 21¼ by 31½ in. Available in belt drive and direct drive models operating at 3450 r.p.m. with a choice of 3-, 5-, and 7½-h.p. motors. Further information to be obtained on request.

(For further details encircle index code 0607)

homeshop vise From The Columbian Vise & Mfg. Company, a new model of their 6CD homeshop vise, incorporating significant new features. It has a 7-in. jaw opening, and fits workbenches up to 2¼ in.



Model 6CD Homeshop Vise

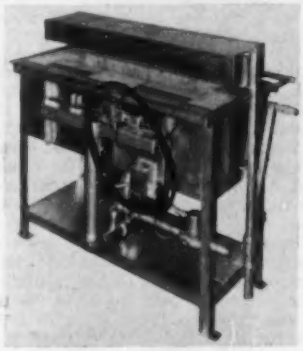
Weight 10 lb., and vises are individually packaged in shipping cartons. For details, please write to the manufacturer.

(For further details encircle index code 0608)

bender and accessories From Di-Acro Corporation, Di-Acro Benders, built like machine tools to reflect the materials and processes of industry. Machined, hardened and ground surfaces wear longer and increase accuracy of duplication. Equipped with Torrington needle bearings to allow students to bend materials easier at peak capacities. Grease fittings provide for lubrication of moving parts. The Di-Acro Bender will form a wide variety of shapes quickly and smoothly with a minimum of setting up. It is possible to make centered eye and off center bends, circles, zero radius bends, scrolls, squares, coils, loops, and spirals with attachments furnished in Bend-R-Pak — an assortment of commonly used accessories. Write for further information on the Di-Acro Bender, or the Di-Acro Bend-R-Pak; also inquire about the current school catalog which lists special machinery package deals, which provide an opportunity to completely equip a metal shop or electrical shop area with the machines that are needed to do an adequate job of instruction.

(For further details encircle index code 0609)

safety pilot system From The Johnson Gas Appliance Company, for use with their No. 133 Forge Furnace. Guaranteed safe, this new system was specifically designed for the convenience and safety



Forge Furnace featuring Safety Pilot System

of student operators. This optional pilot system will eliminate backfire when lighting the furnace, and it also automatically shuts off the gas if the flame goes out. Please write for more information.

(For further details encircle index code 0610)

metalworking machine From Lennox Industries, Inc., their bench model TE-100 Lennox "All-American" Tru-Edge Metlmastr, shown in the background of accompanying illustration, along with some

Lennox Model Metlmastr

projects. The Metlmastr shearing, forming and piercing machine performed the machine operations in the making of the aluminum serving trays, lazy susan, nut and fruit bowl, nut dishes, weather vane, server, and house number with rooster shown on table, foreground. The practicability of the Metlmastr's application for individual vocational projects in industrial arts and vocational training was shown in daily demonstrations at the recent convention in St. Louis, of the American Industrial Arts Association, Inc.

(For further details encircle index code 0611)

cyclone dust collector From Torit Manufacturing Company, a new series of centrifugal dust collectors developed to provide up to 2500 c.f.m. of air with a 5-h.p. motor. With greater capacities under comparatively low horsepower, these Model 20

(Continued on next page)

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Height — 25", diameter — 26", inside diameter — 10", BTU per hour — 120,000, gas supply line — 1", max. capacity — #16 crucible, blower — #1202, 1/25 HP, 110 V, shipping weight — 375 lbs.

Johnson 510 furnace $239.00 with #10 crucible

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SHOP EQUIPMENT NEWS

(Continued from previous page)

Dust Collector

cyclone separators expand the Torit line of industrial dust collectors and extend the number of applications possible with a single series of collectors. While primarily designed to handle materials like dust, chips, shavings, and blocks from wood, metal and plastics, the Series No. 20 shows great efficiency with materials having the consistency of flour, etc. Information is available on its blower, fan, and long tapering cone design, as well as numerous other pertinent features. Please write for this data.

(For further details encircle index code 0612)

electronic kit From Science Electronics, Inc., their electronic kit to help update

Electronic Kit

and upgrade the training of electronic technicians, designed around the new "Industrial Electronics" manual developed by the Electronic Industries Association and the New York Trade School. This book covers the basic experiments that are the fundamental building blocks of industrial electronic technology, and the manual was developed to provide high technical standards, modernize and extend the scope of instruction in training electronic technicians. The experiments in the laboratory manual can be "breadboarded" from the components and parts in Science Electronics Erec-Tronic Kit BE-7. The kit is designed with pull-out drawers which have silk screened areas for quick inventory control of components. The middle section of the kit contains high current and high voltage fixed test instruments mounted behind a protective plastic panel.

Science Electronics has also developed electronic kits keyed to other manuals in the series covering "Basic Electricity," "Basic Electronics," "Basic Radio and Radio-Receiver Servicing," and "Basic Television and Television-Receiver Servicing."

(For further details encircle index code 0613)

precision dial indicator From The L. S. Starrett Company, two precision dial indicators which have an A.G.D. accuracy of plus or minus .0005 in., for the .015 in. total range (2½ turns). Starrett No. 25–109 is a balanced dial in-

Super Precision Dial Indicator

dicator with a range of 0-3-0, one revolution .006 in., total range .015 in. Starrett No. 25–209 is a continuous dial model, reading 0–6, one revolution .006 in., total range .015 in. Both indicators are furnished with jeweled bearings. For complete information, write for New Tools Bulletin No. 143.

(For further details encircle index code 0614)

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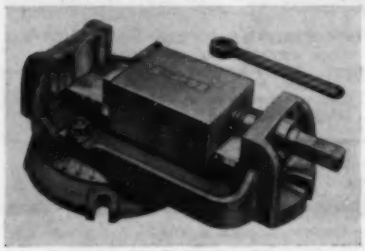
milling machine vise From the Wilton Tool Manufacturing Company, producer of commercial and industrial vises, C clamps, and hydraulic tools, their new 4½-inch Milling Machine Vise, featuring a generously proportioned coolant trough; a replaceable steel gib plate; and reversible steel jaw faces (one side is smoothly ground surface and the other has vertical and horizontal "V" slots). It comes in a



Milling Machine Vise

stationary flanged base model, or with a graduated swivel base. The stationary base unit weighs 50 pounds and has an over-all height of 4¾ inches. The swivel base model weighs 61 pounds. Both models open to 4 inches and have a jaw depth of $1\frac{25}{16}$ inches. Further information available.

(For further details encircle index code 0615)

micrometer caliper for schools From the Central Tool Company, Inc., the "Supreme" Micrometer, to fill the long-felt need by schools for an accurate, reliable micrometer caliper at a reasonable price.

Supreme Micrometer Caliper

It measures from 0 to 1 in., by thousandths (accurate to .0005 in.), has a dull chrome finish, clear, precise markings, and is furnished in a polyethylene "holster" which protects the tool and serves as a handy pocket case. Further information is available from the manufacturer.

(For further details encircle index code 0616)

carrying case From Electronic Instrument Company, Inc., the luggage-type carrying case designed for the new EICO Model RP-100 Stereo/Mono 4-Track Tape Deck. It is sturdily constructed of wood

Carrying Case for EICO Model shown

and nickel-plated hardware, and covered with decorator-stitched charcoal gray vinyl. It holds the RP-100, with two 7-reels, for safe and comfortable carrying. Please write for additional information.

(For further details encircle index code 0617)

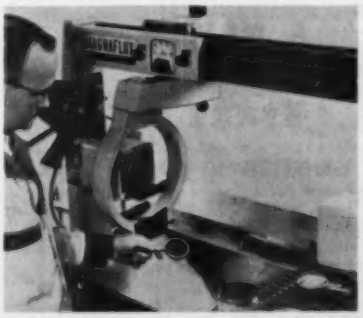
automatic lighting unit From General Scientific Equipment Company, their redesigned emergency lighting unit, which provides maximum protection and sufficient illumination to carry on operations for many hours in case of power failure. Without

Automatic Emergency Lighting Unit

touching a switch, light instantly illuminates the area if regular power fails. It is powered by a storage battery built into the portable set. A trickle charger automatically maintains the charge of the battery. A built-in hydrometer indicates the state of the battery at a glance. Designed primarily for industrial plants, institutions, laboratories, hospitals, etc. Complete information may be obtained on request.

(For further details encircle index code 0618)

instant mixing concentrates From Magnaflux Corporation, a complete new family of materials for the wet method of visible and fluorescent magnetic particle testing, called concentrates. This constitutes a major development in the process of locating invisible cracks in ferrous material and parts. All in powder form and incorporating features superior to the previous Magnaflux and Magnaglo pastes, the new materials provide easier mixing, handling, and storage; a measurable increase in fluorescent brillance from 70 to 600 per cent; closely controlled particle size range; less foaming; and more corrosion protec-



tion. Most noteworthy feature of the new concentrates is the ease with which a magnetic particle test bath can be prepared. Shown in the illustration, the inspector adds new Magnaglo Dry Concen-

(Continued on next page)

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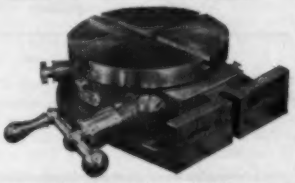

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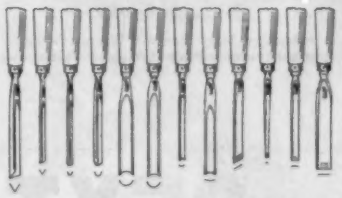

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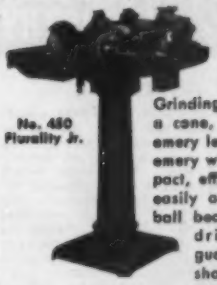

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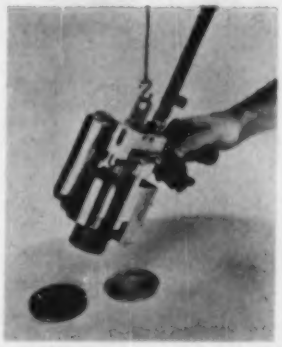
SHOP EQUIPMENT NEWS

(Continued from previous page)

trate to tank of oil or water after measuring proper amount in a graduated cup. A uniform suspension is obtained almost immediately. Descriptive literature or field engineering consultation may be obtained by writing to Magnaflux Corporation, a subsidiary of General Mills.

(For further details encircle index code 0619)

low melting alloys From Cerro Sales Corporation, their low melting bismuth alloys, usable under various working conditions, for instance, in the soldering of glass and metal and reproducing surface finishes and contours using a Fiore



Alloy Sprayer. In the illustration is shown how low melting alloy is sprayed on a master pattern to obtain a duplicate in reverse. The coin at the left is being sprayed with Cerrosafe® alloy. The duplicate on the right was stripped from the coin at the left. Demonstrations showing the behavior of low melting bismuth alloys were a high light of the Cerro Sales Corporation exhibit at the American Society of Tool and Manufacturing Engineers Exposition, May 22 to 26, at the New York Coliseum.

(For further details encircle index code 0620)

Descriptive Material . . .

From Craftsman Wood Service Company, their 1961 catalog No. 27, containing 132 pages depicting their full selection of fine quality Stanley power tools, as well as a complete stock of rare and unusual domestic and imported hardwoods, and introducing a complete line of wood-grain

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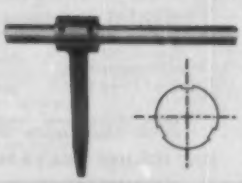

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modern plastic table and cabinet legs in a wide variety of lengths, with still another section devoted to mosaic tiles. In addition, this Buyers Guide features the Craftsman line of cabinet hardware, metal and wood turned legs, lamp parts, upholstery supplies, and "lazy susans." Catalog available for 25 cents.

(For further details encircle index code 0621)

From R. K. LeBlond Machine Tool Company, a new illustrated bulletin No. HD-1016, describing the LeBlond NE design Heavy Duty Lathes. Full details are given on these small (20 hp) heavy duties which are available in four sizes which provide from 17½ in., to 25 in. swing over the beds. They offer 27 different spindle speeds and 60 thread changes. Specifications and descriptions of NE design toolroom and plain bed gap lathes are also included. Please write to the manufacturer for Bulletin No. HD-1016.

(For further details encircle index code 0622)

From Delta Power Tool Division, Rockwell Manufacturing Company, an eight-page, illustrated bulletin describing the recently introduced Delta 12-inch Cut-Off Machine. It describes the four cost-saving machines to choose from — for dry abrasive cutting, for wet abrasive cutting, for nonferrous cutting, and for wood cutting. Operational photographs describe the precision engineered features that save production time and promote operating economy. The bulletin also includes specifications, catalog listings, and listings of all motors and motor controls and accessories.

(For further details encircle index code 0623)

From Craftools, Inc., a four-page catalog on Dryad weaving looms, accessories, and books. Catalog covers all types of looms — rug; foot-power; folding; cottage; table — plus warping apparatus, shuttles, accessories, and books. Catalog free upon request on letterhead.

(For further details encircle index code 0624)

From U. S. Burke Machine Tool Company, a new instruction manual on vertical milling machines, available to shop teachers for class use at no charge. Contents of the manual begin with the nomenclature of standard vertical milling machine components; and sections are devoted to milling procedures and safety procedures in operating milling machines; and included are sections on milling speeds, feeds and coolants; cutters used on vertical milling machines; three shop projects given for student use on vertical milling machines; special test sheets on milling machine and cutter nomenclature in pads of 100, and castings and instructions for a shop project.

(For further details encircle index code 0625)

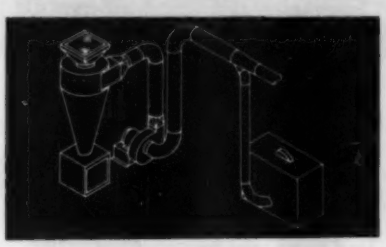
From Challenge Machinery Company, an informative, four-page, descriptive folder on the operating features and specifications of the Challenge Champion 30½-in. power paper cutter which offers fast, easy, cutting for printing plants and in-plant duplicator operations. Ask for publication 650.

(For further details encircle index code 0626)

Wilton Tool Manufacturing Company, Inc., have made available for immediate distribution, a new condensed School Catalog — No. 740. Included in this handy brochure are illustrations, specifications, and prices on the complete Wilton line of vises for the school trade, and many new models are introduced. Featured in the catalog is the new 7-in. Offset Vise, said to provide greater critical clamping area, the strength

(Concluded on next page)

NO DUST OR SHAVINGS IN THIS SCHOOL SHOP!



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Write: *Also Available (upon request)—new #75 Electronics Catalog.*
DONJER PRODUCTS COMPANY
1338 UTICA AVENUE BROOKLYN 3, NEW YORK

DESCRIPTIVE MATERIAL

(Continued from page 57)

and convenience of a 10-in. vise, and the compactness of a 7-in. vise; also Wilton's new 86 Woodworkers' Vise, a lightweight, easily mounted vise designed especially for elementary school shops, featuring a dog in the front jaw and a rugged hickory handle with large round knobs. On its back cover, the catalog shows a new low cost, 4½-in. Milling Machine Vise, and Utility Bench Vises known as the 640 line, and two new lines of "C" clamps. To obtain a copy of School Catalog No. 740, write to the manufacturer.

(For further details encircle index code 0627)

from the field . . .

Cerro Sales Corporation announce the appointment of Ivor Thompson as vice-president of their organization. Richard H. Lewin is president. Cerro Sales Corporation is a subsidiary of Cerro Corporation, U. S. producers and fabricators of nonferrous metals.

DeWalt, Inc., has completed an agreement to obtain from the Atlas Press Company, Kalamazoo, Mich., all designs, tools, jigs, and fixtures of certain stationary woodworking tools which were formerly a part of the Atlas line. Effective June 30, 1961, DeWalt will add these new models to its existing product line. Atlas will continue to make and market its well known line of stationary metalworking tools. Construction of additional space to facilitate manufacture of the new tools began April 1.

Black & Decker Manufacturing Company announce the appointment of Ernest E. Randle as Los Angeles district sales manager of their industrial-automotive division, effective April 1, 1961. By mutual agreement Mr. Randle succeeds Robert E. Stone, Jr., who, because of his long experience with large manufacturers in southern California, will be sales representative for Master Power Corporation, the air tool manufacturing subsidiary of Black & Decker.

Also effective April 1st, a new sales district of the Industrial-Automotive Division, The Black and Decker Manufacturing Company has been formed, with district office at Charlotte, N. C. Floyd W. Cowan has been named district sales manager. The district comprises the states of North Carolina and South Carolina, which were formerly part of the power tool firm's Atlanta district.

Rockwell Manufacturing Company has named E. L. Tabat vice-president of marketing for their Power Tool Division with responsibility for the combined marketing operations of Delta and Porter-Cable.

J. J. Diamond has been named eastern sales manager and B. E. Coon, western sales manager. They will handle both Porter-Cable and Delta sales.

John H. Diehl has been named assistant vice-president, manufacturing, with headquarters in Pittsburgh. He will have direct control of the manufacturing operations at Rockwell's Bellefontaine plant and The Porter-Cable Machine Company plant in Syracuse.

Donald P. Henry, assistant general manager at Bellefontaine, will replace Mr. Diehl as general manager of the plant.

David A. A. Ridings, Porter-Cable sales engineering manager, will become vice-president and general manager of the Porter-Cable Machine Company.

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READER'S SERVICE SECTION

INDEX TO SHOP EQUIPMENT

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64	**Bedford Lumber Co.** Cedar, veneer chests & red cedar lumber	56
65	**Bruce Publishing Company** Shop Project books	3rd cover
66	**Can-Pro Corporation** Aprons and shop coats	58
67	**Columbian Vise & Mfg. Co.** New "wide-side" vises	6
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INDUSTRIAL ARTS AND VOCATIONAL EDUCATION
400 North Broadway, Milwaukee 1, Wisconsin
June, 1961

Please ask the manufacturers, whose code numbers I have encircled, to send me the information, catalogs, or product literature offered in this issue.

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CONTEMPORARY AND TRADITIONAL FURNITURE, Weeks, $3.50

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55 NEW TIN CAN PROJECTS, Lukowitz, 90 cents

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(For more information from advertisers, use the postcard on page 59)

NEW DELTA Grinder helps you do more—

can't forget its goggles

No matter what type of grinding or buffing operations your students are doing, there's never a worry about safety with this new 7" Grinder. The Twin-Lite Safety Shields have double strength, shatter-proof glass, are mounted to permit easy swivel to side or rear when necessary and have bayonet-type bulbs that light both sides of the wheels. In addition, the wheel flanges furnish extra support (to meet ASA Safety Code Specifications) and the new small diameter motor with extended shafts provides plenty of clearance for difficult, bulky grinding jobs. And there are many more features you'll appreciate—features that make this the safest grinder on the market.

Over 32 years of Delta "know how" and service to the school shop field are your assurance that Delta tools are safe, practical and economical. Call your Delta Industrial Distributor (listed under "TOOLS" or "MACHINERY" in the Yellow Pages) for all the details on the new 7" Grinder.

FREE BROCHURE: Pictures and describes the new Delta 7" Grinder available in bench and pedestal-type models. Write: Rockwell Manufacturing Company, Delta Power Tool Division, 402[illegible] N. Lexington Avenue, Pittsburgh 8, Pa.

DELTA INDUSTRIAL TOOLS

another fine product by

ROCKWELL

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